TAMIL NADU AGRICULTURAL UNIVERSITY

NINTH ANNUAL REPORT

April 1, 1979 to March 31, 1980

CONTENTS

PAGE

1. INTRODUCTION 1

2. UNIVERSITY ADMINISTRATION 6

Officers of the University - Board of Management - Academic Council Board of Studies - Board of Examinations - Courses and Curricula - Students Admission - University Examination - Trimester System of Education - Research Council - Extension Education Council - Meetings, Seminars and Workshops - Visit of Staff Members to Foreign Countries - Campus Deve'opment.

3. TEACHING 35

Faculty of Agriculture - Faculty of Horticulture - Faculty of Agricultural Engineering - Faculty of Basic Sciences and Humanities - Centre for Agricultural and Rural Development Studies - Faculty of Veterinary and Animal Sciences - Faculty of Fishery Science - Farm Science Centre.

4. RESEARCH 60

Faculty of Agriculture - Faculty of Horticulture - Faculty of Fishery Science - Facultv of Basic Sciences and Humanities - Faculty of Agricultural Engineering - Faculty of Veterinary and Animal Sciences.

5. EXTENSION EDUCATION 194

Training Programmes - Seminars and Conferences - Farm Advisory Council - Farmers' Training Centres - National Demonstrations - Other Farmers' Contact Programmes.

6. FINANCE AND ACCOUNTS 209

Opening Balance - Receipts - Expenditure - Scholarships - Prizes-Grant-in-aid-University Budget for 1980 - 81 - Audit.

7. APPENDICES

i. Important Visitors to the Tamil Nadu Agricultural University

ii. Schemes financed by the ICAR and other agencies

iii. Books and Booklets published during 1979-80

iv. Scientific papers published during 1979-80

v. Popular Articles and Jottings published during 1979-80

vi. Number of enquiries answered, quantity of improved materials supplied, artificial insemination done etc., by the various departments of Tamil Nadu Agricultural Universiry

vii. Programmes Broadcast during 1979-80

viii. List of "On Going Research Projects"

ix. Thesis Submitted and Approved during 1979-80

1. INTRODUCTION

The Ninth Annual Report covers the period 1979 - 80. The Eighth Convocation of the University was held on March 9, 1980 when 30 candidates were conferred with Ph.D. Degree, 189 with Master's Degree and 423 with Bachelor's Degree both in person and *in absentia*.

The concerted efforts of scientists of various departments resulted in the release of ten high yielding varieties of crops such as rice, sorghum, minor millets, pulses and vegetables, and in the development of suitable techniques for improving crop and animal productivity. The Directorate of Extension Education, Farmers Training Centres, Farm Science Centres and National Demonstration Scheme were working in close collaboration with the Government Development Departments and agencies and farming community for effective transfer of technology.

ACHIEVEMENTS

Herein below are some of the major achievements of the University listed out.

Education

... New post-graduate degree programmes were started during the year in the following disciplines :

... M.Sc. (Ag.) in Plant Nematology
... Ph.D. in Gyanaecology and Obstetrics
... Ph.D. in Pharmacology
... Ph.D. in Agricultural Microbiology.

In addition to the above programmes, the following courses were also offered.

... A short term course in Plant Protection
... A short term course in Horticultural Nursery practices.

... In the Fisheries Faculty, four new departments viz., Fishery Biology, Fish culture, Fishery Environment and Fishery Technology were formed to provide adequate educational support to B.F.Sc. degree programme and to intensify research efforts in these areas.

... In the B.V.Sc. degree programme, six-month intership was included to develop in-depth skill and knowledge by providing greater amount of attention and training in practical experience.

... To provide opportunities for the teachers to become more efficient in teaching, inservice training course in 'Learning and Teaching' was organised at the main campus.

... A separate position of Dean, Post-Graduate Studies was created for further strengthening the P.G. degree programmes.

... A centre for excellence named as "Advanced Centre for Agricultural Microbiology" was established. This centre is expected to bring increased benefits to the farming community through fundamental and applied research in problems relating to crop productivity.

... In order to initiate in-depth studies relating to agricultural and rural development problems at the socio economic level a "Centre for Agricultural and Rural Development Studies - CARDS" was established with a Director to head the centre. This centre will also involve itself in the training of personnel of mid-level management connected with the above development programmes.

... In view of increasing importance and additional efforts required for crop improvement, a "School of Genetics" with a separate Director was established. The above school will reorient the research activities in crop improvement giving due emphasis for multi-disciplinary approach to the problems relating to future crop improvement work.

... Towards improving the quality of training and education the following changes have been effected.

... Post-graduate degree courses were reviewed and restricted into M.Sc. (600 series) and Ph.D. Courses (800 series) separately. Till now courses intended for these Post-graduate degree programmes were under 600 series with some overlapping between the two.

... In the Under-graduate degree programme separate cadre of teachers have been identified and designated exclusively for teaching only. The course contents and teaching methods have been suitably modified to fit in with the 10+2 system which has come into vogue at the higher secondary level. Adequate care has also been bestowed to impart practical orientation take-ing into account the specific problems of rural areas.

Research

... Operational Research was undertaken in water management, dry land farming, low cost technology, integrated pest management, and poultry disease investigation.

... Research in cropping systems was intensified with emphasis on multiple, relay and bund cropping.

... Steps are underway to upgrade/start Regional Research Stations in six different agro-climatic zones in the State under the World Bank - ICAR National Agricultural Research Project The ICAR will be sending a Research Review Committee for recommending the assistance requested for.

... The following new research schemes were implemented during the year.

... Agricultural Climatology

... Standardization of seed production and seed storage techniques in tropical vegetables

... Foliar diagnosis of plant nutrient def ciencies

... Genetic potential of rice dwarfs

... Pulses genetic differentiaticn.

... Efforts are underway to locate a suitable site in Kanyakumari District for establishing a multi-crop research station to handle problems relating to coconut, spices and condiments. This station will also concentrate on evolving suitable cropping systems and agronomic practices for other crops in the area.

... The Scheme for Intensification of Research and Extension for Pulses and Oilseeds was started at Aduthurai, Vridhachalam and Kovilpatti with the active collaboration of ICAR.

... The National Pulses Research Centre was established at Vamban with assistance from ICAR. Efforts are being made to develop this as a Centre of Excellence.

... Research system on programme planning, execution and evaluation has been reorganised and been made more effective. The following are the measures taken to implement the above concept.

A Council of Direction was formed to approve project proposals, and for evaluation and closure of research projects. This Council consists of the Vice-Chancellor, Director of Research and Director of Extension Education This Council also reviews the work for possible mid-term correction and gives direction for further follow up work.

... Whenever projects are completed, the results are presented to a small group of Scientists who will have opportunities to comment on the findings. The communication specialists are involved in the discussions for speedy dissemination of research results to farming community.

... Subject Specialists have been identified in more disciplines. They are designed to go through project proposals and completion reports, and suggest suitable alternatives whenever needed. The Specialists are having state-wide responsibility for all research programmes concerning their disciplines.

... Each Scientist has committed himself with specific projects for the year 1980-81. The contents and relevance of these projects have been discussed thoroughly before approval.

... Two new Departments viz., Department of Clinics and Department of Animal Disease Investigation and Control were set up at the Madras Veterinary College for effective service to the public.

... One Poultry Research cum-Investigation Centre was started at Namakkal, Salem district to attend to the problems of poultry farmers in and around that area.

.. One new breed of fine wool sheep "SANDYNG" was evolved at Sheep Breeding Research Station, Sandynallah, the Nilgiris after about 10 years of research work.

... Crop Production Manual issued by the Department of Agriculture was updated by the University scientists after detailed discussions with officials in the Directorate of Agriculture. This has resulted in the production of documents which will give uniform recommendations to the farmers in the State.

... A basic document was prepared enunciating all the research findings that are to be adapted by the farmers in various crops These recommendations will be strictly followed in University farms to demonstrate their efficacy and productivity.

... A document on Post-Graduate Thesis Abstract, 1979 was prepared and this contains Summary of M.Sc., and Ph.D., thesis in the Faculties of Agriculture, Horticulture, Agricultural Engineering and Veterinary Science. Nearly 222 theses were summarised in the above document. This is the first attempt of its kind being made in Tamil Nadu Agricultural University. It is intended to make it a regular feature in the years to come Similarly another publication named 'TNAU research highlights 1979' was also brought out by the University. This document includes useful findings and contributions made by the University scientists. This is also the first attempt of it kind and it is intended to continue the publication every year.

FOCUS

1. A series of state level and national level seminars will be organised in the University to bring out interaction ideas in various disciplines of Agriculture, Horticulture, Agricultural Engineering and Basic Sciences.
2. Starting a Home Science College in Madurai Campus to fulfil the long felt of the Madurai region and also fill in the lacunae in Agriculture University Concept.
3. Intensify our efforts to establish a Dryland Research Station with multi-disciplinary programmes.

4. Pursue further action for the establishment of Regional Research Station in North Arcot District where research efforts towards location specific problems are needed. The variety of crops grown in this crop will have to be given due consideration. In addition, research in oilseeds will get a major fillip since this possesses the largest area under rainfed groundnut.

   Similarly, Krishi Vigyan Kendra, Tiruchy is to be upgraded as the State level research station to tackle soil salinity and alkalinity problems faced by thousands of farmers in extensive area spread over the whole Tamil Nadu. These two stations are intended to be developed through the assistance of World Bank through ICAR - IBRD sponsored NARP.

5. Starting a research station for fruits, spices and plantation crops in Kanyakumari District.

6. Establishing rural observatories to monitor socio-economic changes in the rural areas.

7. Undertaking studies on alternate sources of energy and developments of new sources of energy and technology for the use.

8. Initiating studies on markets and marketing systems for policy alternatives and strategies for efficient marketing of farm products.

9. Carrying out studies on the management of water resource system relating to water use and watershed planning.

10. Developing integrated pests and disease control system for areas not covered so far.

11. Establishment of Plant clinics to undertake on farm research on plant pests and diseases, their management and control.

12. Three Regional Veterinary and Animal Husbandry Research-cum-Investigation Centres (One each in Tirunelveli, Periyar and Dharmapuri Districts) will be established.

13. Three Poultry Research-cum-Investigation Centres (One sach in Madurai, Ramnad and Tiruchy Districts) will be started.

14. Establishment of Radio Isotope and Trace Mineral Nutrition Unit at Madras Veterinary College, Madras to map out areas of mineral deficiency in the state.

15. Establishment of Quality Control and Service Division of Animal Feeds at Madras Veterinary College, Madras to evaluate the quality of the feed supplied by private and government agencies.

2. UNIVERSITY ADMINISTRATION

A. Officers of the University

Chancellor	: Thiru Prabhudas B. Patwari Governor of Tamil Nadu
Pro-Chancellor	: Thiru P. Kolandaivelu Minister for Agriculture (upto 16.2.80) Thiru T.N. Lakshminarayanan Adviser to the Governor (L) (from 16.2.80)
Vice-Chancellor	: Thiru A. Venkataraman, I.A.S.
Registrar	: Dr. C.V. Govindaswamy (upto 29.2.80) Dr. D. Raj (from 1.3 80)
Comptroller	: Thiru M. Balasubramaniam (upto 4.4.79) Dr. S.R. Sree Rangaswamy (from 5.4.79 to 16.5.79) Thiru P.V. Krishnamoorthy (from 17.5.79)
Dean, Agricultural College and Research Institute, Coimbatore	: Dr. P. Chandrasekaran (upto 29.2.80) Dr. V.N. Madhava Rao (from 1.3.80)
Dean, Agricultural College and Research Institute, Madurai	: Dr. K.K. Krishnamoorthy
Dean, College of Agricultural Engineering, Coimbatore	: Prof. R K. Sivanappan

Dean, Basic Sciences and Humanities, Coimbatore	:	Dr. S.R. Sree Rangaswamy
Dean, Veterinary College, Madras	:	Dr. V M. Ramaswamy
Dean, Faculty of Horticulture, Coimbatore	:	Dr. C.R. Muthukrishnan
Dean, Faculty of Fisheries, Tuticorin	:	Dr. M. Narayanan Kutty
Dean, Post Graduate Studies, Coimbatore	:	Dr C.V. Govindaswamy (upto 29.2.80) Dr. P. Chandrasekaran (from 1.3.80)
Director of Research (Agriculture)	:	Dr. V. Rajagopalan (upto 3.3.80) Dr. S. Jayaraj (from 4.3.80)
Director of Research (Animal Sciences)	:	Dr. S. Rajamani
Director of Extension Education	:	Dr. C.R. Muthukrishnan (upto May, 79) Dr. P.V. Marappan (upto 29.2.80) Dr. Y.B. Morachan (from 1.3.80)
Director, Centre for Agricultural and Rural Development Studies, Coimbatore (post created from 1.8.79)	:	Dr. V. Rajagopalan (from 1.8.79)
Director, School of Genetics Coimbatore (post created from 1.3.80)	:	Dr. P.V. Marappan (from 1.3.80)

B. Board of Management

Chairman

Vice-Chancellor	:	Thiru A. Venkataraman, I.A.S.

Members

Commissioner and Secretary to Government (Agriculture Department)	:	Thiru N. Hari Bhaskar, I.A.S.
Commissioner and Secretary to Government (Finance Department)	:	Thiru K. Venkatesan, I.A.S.
Director of Agriculture	:	Thiru S.A. Subramani, I.A.S.
Director of Fisheries	:	Thiru C. Chellappan, I.A.S.
Director of Animal Husbandry	:	Thiru P. Doraiswamy, I.A.S.
Chief Conservator of Forests	:	Thiru R. Pasupathi, I.A.S.
Agricultural Scientist	:	Prof. A. Subramaniam (from 30.5.79)
Crop Farmer	:	Thiru W.P.A.R. Rajaram (from 30.5.79)
Livestock Farmer	:	Thiru P.S Rajagopal Naidu (from 30.5.79)
Nominee for Agro-Industries	:	Thiru K. Ramaswamy (from 30.5.79)
Women Social Worker	:	Tmt. Jaya Arunachalam (from 30.5.79)
Educationist	:	Thiru T.S. Avinashilingam Chettiar (from 30.5.79)
Nominee of Indian Council of Agricultural Research	:	Dr. V. Nagarajan (from 30.5.79)
Member of Legislative Assembly	:	Thiru A.M. Paramasivam, M.L.A. (upto 16.2.80)
Member of Legislative Council	:	Thiru M. Sankaralingam, M.L.C.

Member - Secretary

Registrar	:	Dr. C.V. Govindaswamy (upto 29.2.80)
		Dr. D. Raj (from 1.3.80)

Meetings of the Board of Management

During the year under report, the Board met five times viz., May 21, 1979, July 21, 1979, Sept. 18, 1979, Dec. 10, 1979 and Feb. 25, 1980. The following were some of the important decisions taken by the Board.

1. Approved the Eighth Annual Report of the University for the year 1978-79.

2. Agreed to hold the Eighth Convocation of the University and to confer degrees on the candidates during Jan. 1980.

3. Approved the establishment of a Regional Research Station in Ramanathapuram District.

4. Approved the starting of a Centre for Agricultural and Rural Development Studies at Coimbatore.

5. Approved the establishment of a School of Genetics.

6. Approved the transfer of Vamban Farm from the State Government to the University and starting of the National Pulses Research Centre at Vamban.

7. Accepted the starting of a Remote Sensing Centre in the University.

8. Considered the proposal of Thiru T. S. Avinashilingam Chettiar, Member, Board of Management to formulate a joint plan of research on Solar Energy and suggested constitution of a Committee for the purpose.

9. Considered and approved decisions of the Committee constituted to examine the recommendations of the report of the I C A R review Committee.

10. Nominated Tmt. Jaya Arunachalam as a Member to the Finance Committee of the University.

11. Nominated Dr. V. Nagarajan as a Member of the Managing Committee and also to the Selection Committee of the Krishi Vigyan Kendra, Pondicherry.

12. Approved the Study Leave Rules of the University.

13. Approved certain amendments to the University Provident Fund Rules.

14. Delegated powers to the Officers of the University for the purchase of Stationery articles.

15. Accorded recognition to the Tamil Nadu Agricultural University Veterinary Administrative Staff Association, Madras.

16. Decided that the provincialised mazdoors may be retired at the age of 60 years on par with L.G.G.S.

17. Approved the admission of the Research Associates to the Family Benefit Fund Scheme.

18. Approved the panel of architects in the University.

19. Decided to resort to recruiting Deans and Directors by advertisement and selections from among the Professors in the TNAU.

20. Approved the appointment of Dr. C. V. Govindaswamy as Dean, Post-Graduate Studies.

21. Approved the upgradation of one post of Professor for the Department of Plant Pathology, AC & RI, Madurai.

22. Approved the revision of scales of pay as per Third Pay Commission to the staff.

23. Approved the proposal of granting UGC scale of pay to the Physical Directors in the University.

24. Approved the sanction of a Special pay of Rs. 250/- p.m. for the posts of Deans and Directors.

25. Approved the sanction of Rs. 100/- as Special pay to those Assistant Professors/Asst. Research Officers who possess Ph.D./D.Sc. qualifications.

26. Approved the sanction of House Rent Allowance, City Compensatory Allowance and Travelling Allowance as per Third Pay Commissions's rate to the Teaching/Research Staff of the University.

27. Sanctioned Rs. 2.30 lakhs for the conduct of Platinum Jubilee Celebration at the Veterinary College, Madras.

28. Sanctioned the payment of House Rent Allowance to the Staff of Kumaraperumal Farm Science Centre, Trichy from 1.3.80.

29. Approved the increasing admission strength and staff pattern for Post-Graduate and Under-Graduate Programmes in the University.

30. Approved the increase in admission strength in M.Sc.(Ag.) degree in Seed Technology.

C. ACADEMIC COUNCIL

Chairman

Vice-Chancellor	:	Thiru A. Venkataraman, I.A.S.

Members

Commissioner and Secretary to Government (Agriculture Department)	:	Thiru N. Hari Bhaskar, I.A.S.
Deans		Dr. K.K. Krishnamoorthy Dean Agricultural College & Research Institute Madurai
		Dr. P. Chandrasekaran Dean Agricultural College & Research Institute Coimbatore (upto 29.2.80)
		Dr. V.N. Madhava Rao Dean Agricultural College & Research Institute Coimbatore (from 1.3.80)
		Prof. R.K. Sivanappan Dean College of Agricultural Engineering Coimbatore
		Dr. S.R. Sree Rangaswamy Dean Faculty of Basic Sciences & Humanities Coimbatore
		Dr. V.M. Ramaswamy Dean Veterinary College Madras
		Dr. C.R. Muthukrishnan Dean Faculty of Horticulture Coimbatore

		Dr. M. Narayanan Kutty Dean Fisheries College Tuticorin
Director of Research (Agriculture)	:	Dr. V. Rajagopalan (upto 4.3.80) Dr. S. Jayaraj (from 5.3.80)
Director of Research (Animal Sciences)	:	Dr. S. Rajamani
Director of Extension Education	:	Dr. P.V. Marappan (upto 1.3.80) Dr. Y.B. Morachan (from 1.3.80)
Six members amongst the Heads of Departments to be nominated by the Vice-Chancellor	:	Dr. K.R Ramaswamy Professor and Head Department of Seed Technology Coimbatore
		Dr. T.K. Kandaswamy Professor and Head Department of Plant Pathology AC&RI, Coimbatore
		Dr. V.D. Guruswamy Raja Professor and Head Department of Agricultural Botany AC&RI, Madurai
		Dr. P. Kothandaraman Professor and Head Department of Poultry Sciences Veterinary College Madras
		Dr. R.A. Balaprakasam Professor and Head Department of Microbiology and Biochemistry Veterinary College Madras
		Vacant

Three members having special knowledge or practical experience in different aspects of Agriculture to be nominated by the Vice-Chancellor :	Dr. C.N. Sambandam Dean Faculty of Agriculture Annamalai University Annamalainagar
	Dr. R. Sakthivadivel Professor of Hydraulics and Water Resources Engineering Guindy, Madras
	Dr. A. Gnanam Coordinator and Head School of Biological Sciences Madurai Kamaraj University Madurai
Secretary :	Dr. C.V. Govindaswamy Registrar (upto 14.2.80)
	Dr. D. Raj Registrar (from 15.2.80)
Director, CARDS :	Dr. V. Rajagopalan (from 1.8.1979)
Director, School of Genetics :	Dr. P.V. Marappan (from 1.3.1980)
Dean, Post-Graduate Studies :	Dr. C.V. Govindaswamy (from 1.9.79 to 29.2.80)
	Dr. P. Chandrasekaran (from 1.3.80)

Meetings of the Academic Council

The Academic Council met four times during the year under report, besides a special meeting held for release of the Thesis Writing Manual, and took the following decisions :

1. Recommended the creation of the Department of Animal Disease Investigation and Control and the Department of Clinics.

2. Recommended the creation of certain posts in the Dairy Science Department, Madras Veterinary College, Madras.

3. Recommended the formation of separate Departments in the Faculties of Horticulture and Fisheries.

4. Approved the sanction of certain new schemes in the Tamil Nadu Agricultural University.

5. Recommended the starting of new degree programmes viz., M.Sc (Ag), in Plant Nematology, Ph.D., Programmes in Pharmacology and Obstetrics and Gynaecology in Veterinary and Animal Sciences and short term courses on Plant Protection and Horticultural Nursery Practices

6. Approved the increase in admission strength in the Post Graduate and undergraduate degree programmes in TNAU.

7. Recommended the increase in the allotment of seats in Agricultural Courses for the farmers' sons.

8. Approved the starting of an Institute for Agricultural and Rural Development Studies in TNAU.

9. Recommended the starting of a Ph.D. degree programme in Microbiology.

10. Approved the creation of certain technical posts in the Department of Seed Technology.

11. Approved the starting of M.Sc. (Ag.), in Plant Nematology and increase in admission strength in M.Sc. (Ag.), in Seed Technology.

12. Approved the revised restructured courses for the Post Graduate Programmes in the Faculties of Agriculture, Horticulture, Fishery Science and Basic Sciences and Humanities and syllabi for Ph.D., in Pharmacology and Obstetrics and Gynaecology.

13. Approved the courses and syllabi of III B.F.Sc.

14. Approved the formation of a separate Department of Agricultural Microbiology, in TNAU.

15. Recommended the creation of a post of Assistant Professor in Fishery Economics at Fisheries College, Tuticorin

16. Approved the establishment of Research-cum-Investigation (Poultry Disease) Centre at Namakkal with certain technical staff.

17. Approved the proposal of starting of a scheme on research on citrus die-back in Pollachi and Kadayam.

18. Approved the change of Nomenclature of the Department of Meat and Milk Hygiene, Veterinary College, Madras as Department of "Meat".

19. Approved the revised syllabi of B V.Sc., degree programme.

20. Approved the admission of meritorious village level workers to B.Sc.(Ag.), degree course.

21. Approved the establishment of the School of Genetics at TNAU.

22. Recognised the following degrees/certificates awarded by other University/Bodies.

   a. Master of Business Adminstration (MBA), Madras University.

   b. Post-Graduate Diploma in the Teaching of English (PGDTE) and Post Graduate Diploma in English Studies (PGDES), Central Institute of English and Foreign Languages, Hyderabad.

   c. Pre-University Examination of the University of Jammu, University of Kashmir and Pre-University Examinations (Science Group) of Jammu and Kashmir (State Board of School Education, Jammu).

   d. M.Sc , Dairy Extension of the Krukshetra University.

23. Approved the establishment of a Centre for Sericulture in TNAU.

24. Compulsory Conduct of qualifying examination in the Post-Graduate programmes was dispensed with.

2.4. **Board of Studies :** The Board of Studies in Agriculture, Agricultural Engineering, Veterinary & Animal Sciences, Basic Sciences & Humanities, Horticulture and Fisheries Science constituted during the previous years continuted during the period under report. Each Board of Studies consisted of the following members :

1. Dean of the Faculty-Chairman
2. Other Deans in the Faculty
3. Head of Departments in Faculty
4. All Professors in the Faculty
5. Two elected representatives from among the Associate Professors and four from among the Assistant Professors.

2. 4. 1. Faculty of Agriculture

Elected Members

1. Dr. P. Narayanaswamy
   Associate Professor of Plant Pathology
   Agricultural College & Research Institute
   Coimbatore

2. Dr. M. Gopalan
Associate Professor of Entomology
Agricultural College & Research Institute
Coimbatore

3. Dr. (Mrs.) P. Savithiri
Assistant Professor
Soil Science & Agricultural Chemistry
Coimbatore

4. Thiru S. Palaniswamy
Assistant Professor of Agricultural Botany
Department of Agricultural Botany
Coimbatore

5. Thiru N. Viswanathan
Assistant Professor of Agricultural Economics
Agricultural College & Research Institute
Coimbatore

6. Dr. G. Perumal
Assistant Professor of Agricultural Extension
Agricultural College & Research Institute
Madurai

Nominated Members

1. Dr. N. Sadanandan
Dean
Faculty of Agriculture
Kerala Agricultural University
Trivandrum
Kerala State

2. Dr. S. V. Patil
Director of Instructions (PG)
University of Agricultural Sciences
Dharwar
Karnataka

Meetings : This Board of Studies conducted a meeting during the year and recommended the following to the Academic Council.

1. Starting of new degree programmes in M. Sc. (Ag.) Plant Nematology at Coimbatore, M.Sc.(Ag.) course in Agricultural Economics and Extension at Madurai and short term courses in Plant Protection.

2. The revised and re-structured courses for M.Sc. (Ag.) and Ph.D. degree programmes.

3. Increase in admission strength in the Post Graduate and Under-Graduate programmes in Tamil Nadu Agricultural University.

2. 4. 2. Faculty of Agricultural Engineering

Elected Members

1. Dr. C. Sriram
   Associate Professor
   Department of Farm Machinery
   College of Agricultural Engineering
   Tamil Nadu Agricultural University
   Coimbatore

2. Thiru K.M. Nachappan
   Associate Professor
   Dept. of Soil and Water Conservation Engineering
   College of Agricultural Engineering
   Tamil Nadu Agricultural University
   Coimbatore

3. Thiru L. Gothandapani
   Assistant Professor
   Department of Agricultural Engineering
   Agricultural College & Research Institute
   Madurai

4. Thiru N.C. Vijayaraghavan
   Assistant Professor
   Department of Farm Machinery
   College of Agricultural Engineering
   Tamil Nadu Agricultural University
   Coimbatore

5. Thiru V.V. Sree Narayanan
   Assistant Professor
   Department of Agricultural Processing
   Tamil Nadu Agricultural University
   Coimbatore

6. Thiru S. Kumaravel
   Assistant Professor
   Dept. of Soil & Water Conservation
   College of Agricultural Engineering
   Tamil Nadu Agricultural University
   Coimbatore.

Nominated Members

1. Thiru G. Ramana Reddi
   Head of the Dept. of Agrl. Engineering
   Andhra Pradesh Agricultural University
   Andhra Pradesh

2. Dr. Jose Samuel
   Head of the Dept. of Agrl. Engineering
   College of Agriculture
   Vellayani, Kerala.

Meetings : This Board of Studies conducted a meeting during the year and recommended the following to the Academic Council.

1. Certain changse suggested in courses of Ag. Stat. 601, Ag. Proc. 601 and 602 and also shifting of Agricultural Extension subject from fourth year B. E. (Ag.) to third year B.E. (Ag.) and vice-versa.

2. 4. 3. **Faculty of Basic Sciences and Humanities**

Elected Members

1. Dr. S. Sadasivam
   Associate Professor
   Department of Biochemistry
   Tamil Nadu Agricultural University
   Coimbatore

2. Thiru N. Natarajarathnam
   Deputy Director of Research (Agri)
   Tamil Nadu Agricultural University
   Coimbatore

3. Thiru S. Subramanian
   Assistant Professor of Psychology
   Tamil Nadu Agricultural University
   Coimbarore

4. Thiru R. Rangaswamy
   Assistant Professor of Statistics
   Tamil Nadu Agricultural University
   Coimbatore

5. Thiru R. Israel Mansingh
   Assistant Professor of English
   Agricultural College & Research Institute
   Madurai

6. Thiru J. Venkatakrishnan
Assistant Professor of Biology
Madras Veterinary College
Madras

Nominated Members

1. Dr. K.S.K. Shastry
Professor of Crop Physiology
University of Agricultural Sciences
Bangalore

2. Dr. B. B. Sundaresan
Director
National Environmental Engineering
Research Institute
Nagpur-20

Meetings : This Board of Studies conducted a meeting during this year and recommened the following to the Academic Council.

1. Revised and Restructured syllabi for M.Sc. and Ph.D. degree programmes in Environmental Biology, Microbiology and Plant Physiology.

2. Revision of syllabi in respect of Post-Graduate courses in Biochemistry Agricultural Statistics, Mathematics and English and Language Communications

2. 4. 4. **Faculty of Veterinary and Animal Sciences**

Elected Members

1. Dr. R. Kadirvel
Associate Professor
Department of Animal Nutrition
Madras Veterinary College
Madras-7

2. Dr. M. S. Gopal
Associate Professor of Clinics
Madras Veterinary College
Madras-7

3. Dr. B. Gowrisankar
Assistant Professor
Department of Pharmacology
Madras Veterinary College
Madras-7

4. Dr. R. Kumararaj
Assistant Research Officer
Poultry Research Station
Madras-35

5. Dr. V. D. Padmanaban
Assistant Professor
Department of Microbiology & Biochemistry
Madras Veterinary College
Madras-7

6. Dr. A. M. Shanmugam
Assistant Professor
Department of Lab. Animal Medicine
Madras Veterinary College
Madras-7

Nominated Members

1. Dr. K. Sathyanarayana Rao
Principal
College of Veterinary Science
Triupathi-517502

2. Dr. D. Venkiah
Principal
College of Veterinary Science
Andhra Pradesh Agrl. University
Hyderabad

Meetings : This Board of Studies conducted a meeting during this year and recommended the following to the Academic Council.

1. Syllabi for Ph.D. in Pharmocology and Obstetrics and Gynaecology.

2. 4. 5. **Faculty of Fisheries**

Elected Members

1. Thiru K. C. Joseph
Associate Professor
Department of Fish Science
Fisheries College
Tuticorin

2. Thiru Samuel Paulraj
Assistant Professor
Department of Fisheries
Coimbatore

3. Thiru P. Jeyachandran
   Assistant Professor
   Fisheries College
   Tuticorin

4. Dr. K. Venkataramanujam
   Assistant Professor
   Fisheries College
   Tuticorin

5. Thiru G. Sanjeeviraj
   Assistant Professor
   Fisheries College
   Tuticorin

Nominated Members

1. Prof. R. Natarajan
   Director
   Centre for Advanced Study in Marine Biology
   Annamalai University
   Parangipett (Porto novo)

2. Prof. H.P.C. Shetty
   Director of Instruction
   Fisheries College
   University of Agricultural Sciences
   Mangalore-575002

Meetings : This Board of Studies conducted a meeting during the year and recommended the following to the Academic Council.

1. The courses and syllabi of third B.F Sc.
2. The changes and modifications in the course and curricula of the total programme of B.F.Sc.

2. 4. 2. Faculty of Horticulture

Elected Members

1. Thiru R. Balakrishnan
   Associate Professor
   Tamil Nadu Agricultural University
   Coimbatore

2. Thiru C.M. Bhakthavatsalu
Associate Professor
Tamil Nadu Agricultural University
Coimbatore

3. Thiru P. Selvaraj
Assistant Professor
Tamil Nadu Agricultural University
Coimbatore

4. Thiru S. Sathiyamurthi
Assistant Professor
Tamil Nadu Agricultural University
Coimbatore

5. Thiru S. Thamburaj
Assistant Professor
Tamil Nadu Agricultural University
Coimbatore

6. Thiru I. Irulappan
Assistant Professor
Tamil Nadu Agricultural University
Coimbatore.

Nominated Members

1. Dr. B. Ranga Reddy
Professor and Head
Department of Horticulture
Andhra Pradesh Agricultural University
Rajendranagar, Hyderabad

2. Prof. K. Srinivasan
Head of the Department of Horticulture
Agricultural College & Research Institute
Vellayani, Trivandrum
Kerala State.

Meetings : This Board of Studies conducted a meeting during this year and recommended the following to the Academic Council..

1. Revised syllabi for M.Sc.(Ag.) and Ph.D. programmes.
2. Awarding of M.Sc.(Ag.) and Ph.D. degree programmes in the Faculty of Horticulture instead of Faculty of Agriculture.

2. 5. **Board of Examinations :** The Board of Examinations met three times during the year under report. The following decisions were taken :

1. Reviewed, moderated and provisionally declared the results of the B.V.Sc. May 1979.

2. Ratified the changes made in the appointment of External and Internal Examiners for B.V.Sc. 1979.

3. Dispensed with the convening of meeting of the Board of Question Paper Setters for B.V.Sc. degree course from 1979.

4. Ratified the change in the commencement of the Fifth and Final B.V.Sc. Part I and II August 1979 examinations and the notification of the last date of the receipt of application for December 1979 B.V.Sc. examinations and the date of commencement of the examinations.

5. Reviewed, moderated and provisionally declared the results of the Fifth and Final B.V.Sc. Part I and II September 1979 examinations.

6. Approved certain changes made in the appointment of External and Internal Examiners for December 1979 B.V.Sc. Examinations.

7. Reviewed, moderated and provisionally declared the results of the B.V.Sc. December 1979 examinations.

8. Approved the panel of question paper setters, External and Internal Examiners for 1980 examinations for B.V.Sc. degree course.

2. 6. **Courses and Curricula** : The trimester system of education is being followed for the B.Sc.(Ag.), B.Sc.(Hort.), B.E.(Ag.), B.F.Sc., M.Sc.(Ag.), M Sc.(Env.Biology), M.Sc. (Plant Physiology), M.E.(Ag.), M.V.Sc. and Ph.D. of all disciplines. Besides this, this system is adopted for the first, second and third years of B.V.Sc. also in the Madras Veterinary College, Madras.

2. 7. **Student Admission :** A total of 3,919 common application forms prescribed for the degree courses in Agriculture, Horticulture, Fisheries Science and Veterinary Science were received. Among them, 1,813 applications were for 212 seats in the I year B.Sc.(Ag.) i. e. 122 at Coimbatore, 90 at Madurai; 591 for 40 seats in the I year B.Sc.(Hort.), 606 for 20 seats in the first year B.F.Sc. and 909 for 116 seats in the first year B.V.Sc. For admission to 50 seats in the first year B.E.(Ag.), 1,028 applications were received.

With regard to Post-Graduate degree programmes for a total number of 225 seats in M.Sc.(Ag.), there were 474 applications for 5 seats each in M.Sc. (Environmental Biology) and M.Sc.(Plant Physiology), 212, and 150 applications were received, respectively. There were 64 applications for 10 seats in M.E.(Ag.) degree programme. There were 113 applications against 80 seats in M.V.Sc. degree programme. There were 135, 42, 26 applications for 42, 3 and 24 seats

in Ph.D. degree programmes of the Faculties of Agriculture, Basic Sciences & Humanities and Veterinary & Animal Sciences, respectively.

The following committees for the selection of candidates to various Under-Graduate and Post Graduate degree programmes were appointed by the Vice-Chancellor :

Programme	Committee members	
B.Sc. (Ag.) B.Sc. (Hort.) B.F.Sc. B.V.Sc.	Thiru C. Manimanthiri Dr. S. Rangarajan	Government Representatives
	Dr. K.K. Krishnamoorthy Dr. V.M. Ramaswamy Dr. P. Chandrasekaran Dr. C.R. Muthukrishnan Dr. M.N. Kutty	
B.E.(Ag.)	Thiru P.K. Radhakanth	Government Representative
	Prof. R.K. Sivanappan Thiru C.R. Shanmugham Dr. K.R. Ramaswamy	
M.Sc.(Ag.) Ph.D.	Dr. K.K. Krishnamoorthy Dr. P. Chandrasekaran Concerned Professor(s) Dr. C.V. Govindaswamy	
M.Sc.(Env.Biol.) M.Sc. (Pl.Phy.) Ph.D.	Dr. S.R. Sree Rangaswamy Concerned Professor(s) Dr. C.V. Govindaswamy	
M.E.(Ag.)	Prof. R.K. Sivanappan Concerned Professor(s) Dr. C.V. Govindaswamy	
M.Sc.(Ag.) Ph.D. Horticulture only	Dr. C.R. Muthukrishnan Concerned Professor(s) Dr. C.V. Govindaswamy	
M.V.Sc. Ph.D.	Dr. V.M. Ramaswamy Concerned Professor(s) Dr. C.V. Govindaswamy	

The list of candidates recommended by the above Selection Committee for the various courses were approved by the Vice-Chancellor and the selected students admitted into the respective colleges. The admissions were completed and classes commenced from October 26, 1979 for all the courses in Under-graduate and for Post-graduate programme the courses commenced on September 5, 1979.

2. 8. **University Examination :** The University Examinations for B.V.Sc. degree were held during May 1979, December 1979 and the results were published in June 1979 and February 1980, respectively. Results for the B.V.Sc. Examinations conducted during March 1980 are yet to be published.

The University Examinations for the supplementary students of the Fifth and Final year Part II B.V.Sc. were held in May 1979, September 1979 and the results published in June 1979 and October 1979 respectively. Results for the B V.Sc. Examinations conducted during March 1980 are yet to be published.

2. 9. **Trimester System of Education :** During the year under report 250 B.Sc.(Ag.), 17 B.Sc (Hort.), 132 B.V.Sc., 49 B.E (Ag.), 11 M.Sc., 184 M.Sc.(Ag), 21 M.V.Sc., 3 M.E.(Ag.) and 30 Ph.D. students successfully completed their degree programme. Besides this one student has been awarded Diploma in Business Management during the year under report.

Research Council

The research council is constituted to make policy decisions on research in various Faculties of the Colleges and Research Stations attached to the University. The Council is functioning from 1973 and following are the members.

Chairman

Vice Chancellor	:	Thiru A. Venkataraman, I.A.S.

Members

Registrar	:	Dr. C.V. Govindaswamy (upto 14.2.80) Dr. D. Raj (from 15.2.80)
Deans	:	Dr. P. Chandrasekaran Dean Agricultural College & Research Institute Coimbatore (upto 29.2.80) Dr. V.N. Madhava Rao Dean Agricultural College & Research Institute Coimbatore (from 1.3.80) Dr. K.K. Krishnamoorthy Dean Agricultural College & Research Institute Madurai

		Prof. R.K. Sivanappan Dean College of Agricultural Engineering Coimbatore
		Dr. S.R. Sree Rangaswamy Dean Faculty of Basic Sciences & Humanities Coimbatore
		Dr. V.M. Ramaswamy Dean Veterinary College Madras
		Dr. C.V. Govindaswamy Dean Post-Graduate Studies Coimbatore *(upto 28.2.80)*
		Dr. P. Chandrasekaran Dean Post-Graduate Studies Coimbatore (from 1.3.80)
Director of Extension Education	:	Dr. C.R. Muthukrishnan (upto 31.3.79)
		Dr. P.V. Marappan (upto 29.2.80)
		Dr. Y.B. Morachan (from 1.3.80)
Director of Agriculture	:	Thiru S.A. Subramani, I.A.S.
Director of Animal Husbandry	:	Thiru P. Doraiswamy, I.A.S.
Director of Fisheries	:	Thiru C. Chellappan, I.A.S.
Chief Conservator of Forests	:	Thiru R. Pasupathi, I.A.S.
Member-Secretary (Director of Research)	:	Dr. V. Rajagopalan (upto 3.3.80)
		Dr. S. Jayaraj (from 4.3.80)

As per Statutes 29 of the TNAU, the Vice-Chancellor nominated the following Heads of Departments who continue to be members of the Research Council of the University for a period of 3 years from February 1, 1979.

1. Dr. D. Raj, Professor and Head, Department of Biochemistry, TNAU, Coimbatore.

2. Dr. R. Appadurai, Professor and Head, Department of Agricultural Botany, TNAU, Coimbatore.

3. Dr. T.K. Kandaswamy, Professor and Head, Department of Plant Pathology, TNAU, Coimbatore.

4. Dr. C.A. Gopalakrishnan, Professor and Head, Department of Animal Husbandry, TNAU, Coimbatore.

5 Dr. R.A. Balaprakasam, Professor and Head, Department of Microbiology and Biochemistry, Veterinary College, Madras.

Five experts to represent different disciplines from outside the University were nominated by the Pro-Chancellor on the recommendation of the Vice-Chancellor and they are :

1. Thiru S. E. Anantharaman, B.E., No. 17, Arcot Mudaliar Street, T. Nagar, Madras - 600 017.

2. Thiru C. Balasubramaniam, Retired Agricultural Meterologist, Coimbatore. (upto 18.7.79)

   Thiru C. L. Sundararajan, B.Sc.(Ag.), Agriculturist, 544, Big Bazaar Street, Coimbatore. (from 19.7.79)

3. Dr. Bertie. A. D'Souze, Retired Dean and Director, Veterinary Education and Research, Veterinary College, Madras. (upto 18.7.79)

   Dr. S. Krishnaswamy, Retired Professor of Dairy Science, 53, Sukrawarpet Street, Coimbatore - 641 001. (from 19.7.79)

4. Thiru T. Jayadev, I.F.S., Retired Chief Conservator of Forests, 15, First Cross, Indira Nagar, Madras - 600 020.

5. Dr. N. Parthasarathy, Retired FAO Expert. (upto 18.7.79)

   Thiru K. Kannaiyan, B.Sc.(Ag.), Retired Cotton Specialist, Thanjavur - 6. (from 19.7.79)

Extension Education Council

Chairmam

Vice-Chancellor : Thiru A. Venkataraman, I.A.S.

Members

Registrar	:	Dr. C.V. Govindaswamy (upto 14.2.80)
		Dr. D. Raj (from 15.2.80)
Deans	:	Dr. P. Chandrasekaran Dean, AC & RI Coimbatore (upto 14.2.80)
		Dr. V.N. Madhava Rao Dean, AC & RI Coimbatore (from 15.2.80)
		Dr. K.K. Krishnamoorthy Dean, AC & RI Madurai
		Prof. R.K. Sivanappan Dean College of Agricultural Engineering Coimbatore
		Dr. S.R. Sree Rangaswamy Dean Faculty of Basic Sciences & Humanities Coimbatore
		Dr. V.M. Ramaswamy Dean Madras Veterinary College Madras
		Dr. C.R. Muthukrishnan Dean Faculty of Horticulture Coimbatore
		Dr. M. Narayanan Kutty Dean Fisheries College Tuticorin
Director of Agriculture	:	Thiru S.A. Subramani, I.A.S.

Director of Animal Husbandry	:	Thiru P. Doraiswamy, I.A.S.
Director of Fisheries	:	Thiru C. Chellappan, I.A.S.
Chief Conservator of Forests	:	Thiru R. Pasupathi, I.A.S.

Five progressive farmers from outside the University nominated by the Pro-Chancellor on the recommendation of the Vice-Chancellor.

Thiru K. Palaniappan
K. K. Pudur
Coimbatore - 28

Thiru C. Muthian Chettiar
Karuvalakarai (PO)
Sembanarkoil

Thiru P. Gomathinayagam
Seva Nilayam
Puliyangudi
Sankarankoil
Tirunelveli District

Thiru S.S. Nagarajan
Chief Agricultural Economist & Adviser
Tractor and Farm Equipments
Madras

Thiru Chevalier Machado
K.S.G.
Tuticorin

Professor of Extension Education in Agricultural Colleges	:	Dr. A. John Knight Professor and Head Department of Agricultural Extension AC & RI, Coimbatore
		Thiru V. Srinivasan Head Department of Agricultural Extension AC & RI, Madurai
Director of Research (Agriculture)	:	Dr. V. Rajagopalan (upto 4.3.80)
		Dr. S. Jayaraj (from 5.3.80)

Director of Extension Education :	Dr. C.R. Muthukrishnan (upto 31.3.79)
	Dr. P.V. Marappan (upto 29.2.80)
	Dr. Y.B. Morachan (from 1.3.80)

During the period under report the Joint Meeting of the Research and Extension Councils were held on 17.9.79 and 10.1.80 at the Main Campus, Coimbatore and various Research and Extension activities of the University were discussed in detail and suggestion for improvement made.

Seminars and Conference

Scientific Workers Conference : The Scientific Workers Conference on Animal Husbandry and Veterinary Sciences was held at the Veterinary College, Madras on April 18 and 19 under the presidentship of Thiru A. Venkataraman, I.A.S., the Vice-Chancellor. The Scientists of the University and Researchers and other officers of the Department of Animal Husbandry, Tamil Nadu Dairy Development Corporation, TAPCO participated in the deliberations. The research findings of the year and future programme were discussed.

All India Rice Workshop : The All India Co-ordinated Rice Workshop was held at TNAU between 5 - 9, April 1979. Dr.Sukdev Singh, Deputy Director General (Commercial Crops), ICAR delivered the Key Note Address. Dr. C.V. Govindaswamy, Registrar, delivered the inaugural Address, Dr. V. Rajagopalan, Director of Research(Agri.) welcomed the participants. The four day workshop was attended by 200 delegates from all over India and abroad. Notable International Scientists viz. Dr. G. Khush, IRRI, Dr. Mathew Dagg, Dr. H.E. Kauffman and P. Crill of Ford Foundation and Dr. John A.Lowe from WARDA and Drs. R.R. Sharma and R. Shah of Nepal attended the workshop.

Workshop on Water Resource Management : The Workshop on "Water Resource Management for Agriculture in Bhavani River Basin" was inaugurated by Thiru A. Venkataraman, I.A.S., the Vice-Chancellor on April 21, 1979 at the main campus. The workshop was attended by Officers and Engineers of the Irrigation, Agriculture and Ground Water Departments of the State Government in addition to the Scientists of the University. Thiruvalargal S. Manavalan, Chief Engineer, Irrigation, PWD, R Jeyabalan, Chief Engineer (Investigation) PWD. P. K. Radhakanth, Chief Engineer (Ag. Engg.) & C. A. Srinivasan, Chief Engineer, Ground Water, PWD., Madras addressed the participants.

Scientific Workers Conference on Fisheries : The First Scientific Workers Conference on Fisheries was held on May 11 at Fisheries College, Tuticorin. The Vice-Chancellor Thiru A. Venkataraman, I. A. S, inaugurated the conference. Scientists from Tamil Nadu Fisheries Department, Central Marine Fisheries

Research Institute (ICAR), Exploratory Fisheries Project (Government of India) and the staff of Fisheries College participated and discussed the various on-going as well as future research projects. Dr. V Rajagopalan, Director of Research, Tamil Nadu Agricultural University, concluded the session.

Workshop on Soil Test-Crop Response Correlation : The ninth annual workshop of the All India Co-ordinated Soil Test Crop Response Correlation Project was held at Agricultural College and Research Institute, Madurai from May 21 to 23. Dr. N.S. Randhawa, Deputy Director General, ICAR, New Delhi presided over the inaugural Session. Dr. A. Mariakulandai, former Principal, AC & RI., Madurai delivered the Key Note Address. Dr. K.K. Krishnamoorthy, Dean welcomed the gathering. Dr. M. Velayutham, Project Co-ordinator of the Scheme presented the progress of work in the project. About 60 delegates all over India attended the workshop.

Seminar on Hill Banana : A Seminar on "Rehabilitation of Hill Banana" was conducted at Horticultural Research Station, Thadiyankudisai on April 27. Thiru A. Venkataraman, I.A.S., Vice-Chancellor presided and inaugurated the Seminar. About 130 planters from Lower Pulneys and Sirumalai Hill Regions participated. An exhibition highlighting the research achievements in the control of bunchy top disease was arranged. The labour saving devices developed for controlling the disease vector were demonstrated.

Seminar on Dryland Agriculture: A Seminar on "Dryland Agriculture" was conducted by the Department of Agronomy on June 18. Thiru A. Venkataraman, I.A.S., Vice-Chancellor inaugurated the Seminar and 19 papers were presented by the Scientists of the University. Dr. S. Govindaswamy, Project Co-ordinator (ORP), Hyderabad participated in the Seminar and presented a paper on "Operational Research Project in Dryland Agriculture".

Subnet Work Workshop : The Subnet work Workshop on Cereal Harvesters was organized at Coimbatore from July 3 - 6 by the Central Institute of Agricultural Engineering, Bhopal (India). The workshop was attended by Principal investigators from India, Indonesia, Iran, Pakistan, Philippines, Thailand, and Republic of South Korea. Dr. N.S. Randhawa, Deputy Director General, ICAR, New Delhi delivered the Inaugural Address. The Vice-Chancellor Thiru A. Venkataraman, I.A.S., chaired the Opening Session and delivered the Presidential Address.

Futurology Workshop on Pesticides : A workshop on Futurology on use of chemicals in Agriculture with particular reference to future trends in Pest Control sponsored by the Futurology Panel of the National Council for Science & Technology (Department of Science and Technology, Government of India) and the Madras Chapter of Indian Institute of Management and Future, was organised by the Institute for Techno Economic Studies, Madras and the Department of Agricultural Entomology, TNAU., Coimbatore at the University campus from August 30 to September 1.

The workshop was inaugurated by Hon'ble Thiru P. Kulandaivelu, Minister for Agriculture and Irrigation, Government of Tamil Nadu on August 30. The Inaugural Session was presided over by Dr. B. Natarajan, Chairman, Institute for Techno Economic Studies, Madras. Thiru A. Venkataraman, Vice-Chancellor delivered the Key-Note Address. A Special Address was given by Dr. S.C. Seth, Member-Secretary, Futurology Panel of the National Council for Science and Technology, Government of India. More than eighty delegates from all over the country attended the workshop and presented papers.

The workshop deliberated business in five separate sessions viz. i) Trends in use of crop protection chemicals with special emphasis on synthetic pyrethroids, ii) plant products in pest control, iii) newer methods of pest control, iv) biological insect pest suppression and v) insecticides and integrated pest control development.

The Valedictory function was presided over by Thiru K.A. Krishnaswamy, Minister for Co-operation, Government of Tamil Nadu on September 1. Thiru A. Venkataraman, Vice-Chancellor presided. Thiru S P. Namasivayam, Workshop Director proposed vote of thanks.

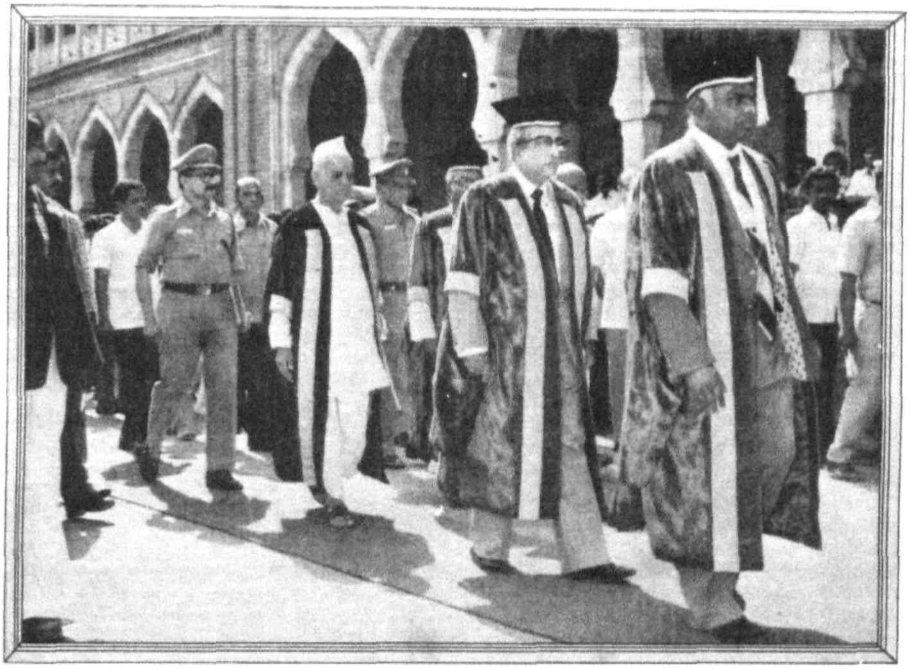
Workshop on Microbial Inoculants: A State level Workshop on Microbial Inoculants was held on September 21 under the Chairmanship of Dr P. Chandrasekaran, Dean (Agri). Officers from the Department of Agriculture, Tamil Nadu and staff members from Universities like Annamalai, Madurai, Madras University, Post-graduate Centre, Coimbatore and Parasakthi College for Women, Courtallum attended the workshop. A total number of 50 participants attended.

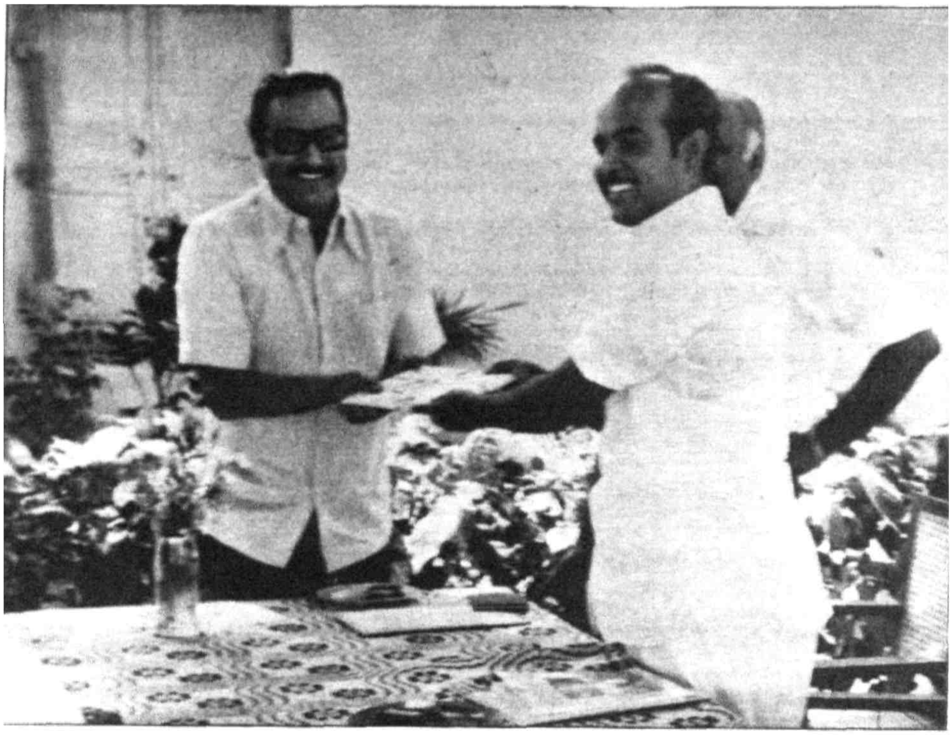
Dr. P. Nandi, Director, PD & AC Research Laboratory, Calcutta delivered the Key-Note Address. The workshop consisted of four scientific sessions viz. 1) Rhizobium legume symbiosis-chaired by Dr. P. Nandi 2) Ecology of Rhizobium-chaired by Thiru K. S. Nair 3) Role of Azotobacter in crop production chaired by Dr. N N. Prasad, 4) Response of crops to inoculation of Azospirillum and blue-green algae chaired by Dr. M. Lakshmanan. Altogether 32 research papers were presented in the workshop.

Seminar-cum-Lab to Land Programme: The Hon'ble Minister for Agriculture and Irrigation and Pro-Chancellor, TNAU. Thiru P. Kulandaivelu inaugurated the Seminar-cum Lab to Land Programme at Ayyankottai village of Madurai District on December 1. More than thousand farmers participated in the above function, discussed their problems with the Specialists and got their doubts clarified. The Minister distributed inputs on subsidy basis for laying out crop demonstrations to the farming families numbering 150 and 216 Agricultural labourers in three villages viz. Thanichiyam, Londayampatti and Andipatti. He also emphasized the need to bring all the findings from the laboratory to the farmers' field in time.

Eighth Convocation - Graduates receiving degree

Eighth Convocation - Academic Procession

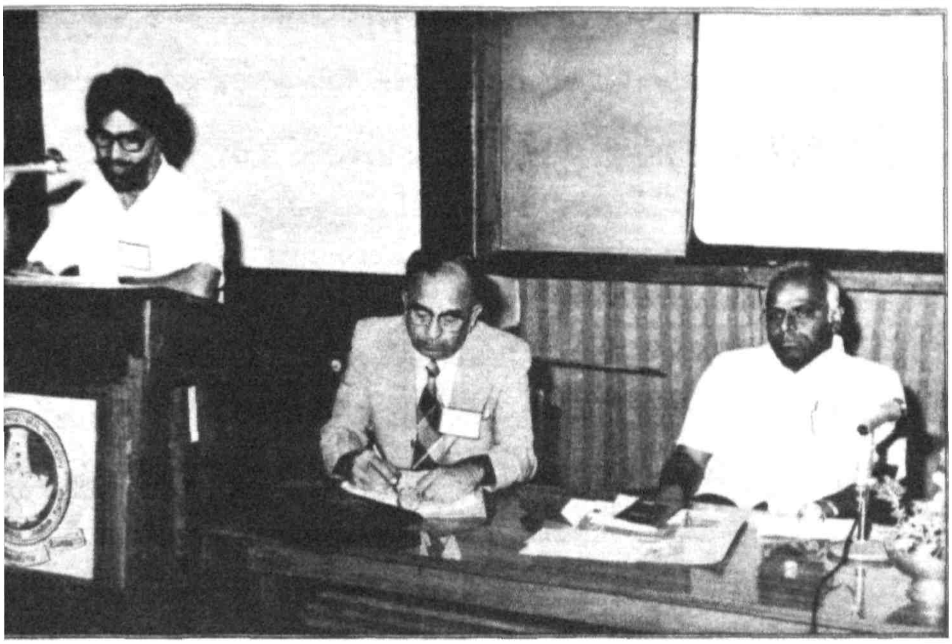




Hon'ble Minister for Agriculture and Pro-Chancellor Thiru K. Kalimuthu, releasing the publication, 'Monograph on Cotton'

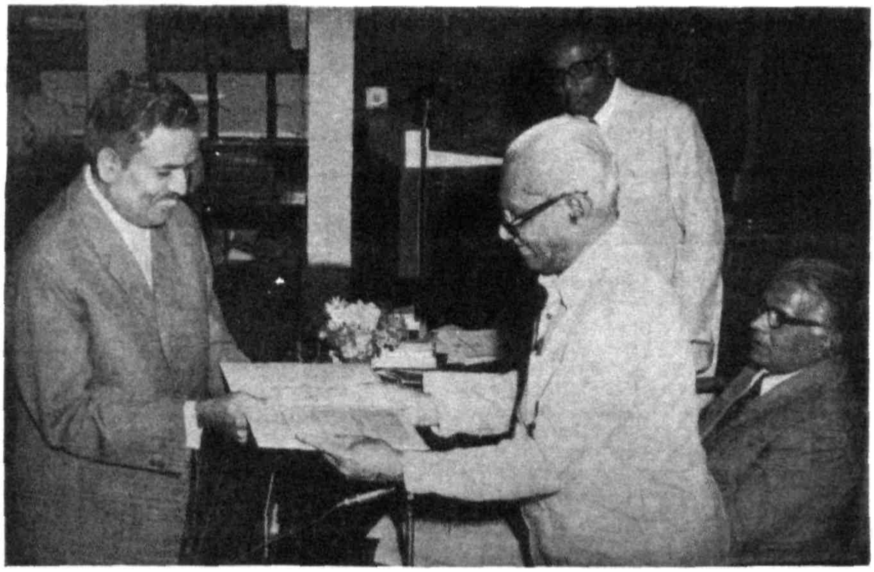
Students with Hon'ble Minister for Agriculture and Pro-Chancellor Thiru K. Kalimuthu

Dr. N. S. Randhawa, Deputy Director General, ICAR, New Delhi delivering the inagural address at Subnet Work Workshop



Futurology Workshop on Pesticides - Thiru K. A. Krishnaswamy, Hon'ble Minister for Cooperation presiding the Valedictory function

Felicitation to Dr. M. S. Swaminathan, the recepient of Norman Borlaugh Award



Dr. S. Jayaraj, Director of Research (Agri.) receiving ICAR Hari Om Ashram Trust Award for Agricultural Sciences from Shri R. V. Swaminathan, Hon'ble Union Minister of State for Agriculture. Dr. O. P. Gautam, Director General, ICAR, looks on

Seminars and Symposia : A Seminar on Soil organic matter and Soil fertility was held at Coimbatore Campus on December 20 and 21, 1979. Scientists from Agricultural Universities of Karnataka, Kerala and Andhra Pradesh participated besides Tamil Nadu. The need to undertake Inter-University collaborative research programmes on organic matter content of soils to enhance the scientific use of all soils was emphasized.

The III Annual symposium of the Indian Society for Veterinary Surgery was held at Veterinary College, Madras on December 7, 1979. Seventy four delegates from other states participated in the deliberations. The interesting feature was demonstartion of cardiac by-pass, acupuncture, and electro necrosis techniques.

Seminar on Agro-based Industries was organized jointly by Agricultural College and Research Institute, Madurai in collaboration with Madurai Productivity Council.

Visit of Staff members to Foreign Countries : Thiru A. Venkataraman, I.A.S., Vice-Chancellor and Dr. V. Rajagopalan, Director, CARDS under Ford Foundation Grant visited United Kingdom, U.S.A., Japan, Thailand and Philippines for a period of 50 days from September 22, 1979 to study the position of Agricultural Development and discuss the problems of mutual interest with the leading Universities, research organisation and educational foundation.

Dr. V. Rajagopalan participated in the Seminar on Rural Poor and Technology held at the Institute of Development Studies, University of Sussex, Brighton, United Kingdom in the month of November, 1979.

Prof. R.K. Sivanappan, Dean, College of Agricultural Engineering on the invitation of the Swedish International Development Authority, Stockholm went on tour to visit the various institutions in Sweden, Norway, Denmark, Holland, England and Israel. He visited about 30 institutions and discussed with about 100 scientists on Agricultural Engineering, education and research in general and land and water management in particular. He also attended the IX International Congress on Agricultural Engineering at East Lansing, Michigan State University, Michigan State. United States of America from July 8 to 13 and presented a paper on "Conservation of Water and Energy by Drip Irrigation". Dr. S. Sankaran, Principal, Kumaraperumal Farm Science Centre, Navalur Kuttapattu and Dr. P. K. Aiyasamy, Professor of Agricultural Economics attended the International Rice Agro-Economic Net work Constraints Workshop at Kandy, Sri Lanka from April 30 to May 3. Dr. V. N. Madhava Rao, Dean, Agricultural College and Research Institute, Coimbatore attended the International Symposium on "Fruit and Vegetables" at Los Banos, Philippines between March 24 and 27, 1980 and presented a paper on Mango and Banana representing the work at Tamil Nadu Agricultural Univarsity. Prof. R K. Sivanappan, Dean, College of Agricultural Engineering, Coimbatore attended a national workshop on "Water

Management and Control of Water at the Farm level" at Vietnam sponsored by the Government of Socialistic Republic of Vietnam and the FAO from March 24-29, 1980. He presented a paper on "Sprinkler and Drip Irrigation including crop water requirement and water scheduling". Dr. K M. Ramanathan, Associate Professor, Department of Soil Science and Agricultural Chemistry, Tamil Nadu Agricultural University, Coimbarore visited the German Democratic Republic as a member of the Indian Team on a study tour of the research institutes connected with the manufacture and export of muriate of potash in GDR from 10th to 20th June 1979.

Campus Development : Two major works viz., Ladies Hostel with Dining Hall for accommodating 100 students at a cost of Rs. 14.00 lakhs and First floor over Engineering College at a cost of Rs. 14.00 lakhs have been taken up for construction under ICAR Grant.

Besides, Godowns for Cotton Breeding Station, Millet Breeding Station, Extension to Dining Hall for Engineering College and Extension to Canteen and a building for Seed Testing Lab, Two Drivers quarters have also been taken up for construction under Capital Works.

The under mentioned works were also taken up in the following Research Stations which are in various stages of progress.

Buildings for Seed Complex at Agricultural Research Station, Bhavanisagar, Three Sheep Sheds and one Watchman shed at Sheep Breeding Research Station, Sandynalla, Three Residential quarters for Professors, Assoc. Professor and Assistant Professor at Regional Research Station, Kaveripattinam, Watchmen shed, Over head tank and Pump Room at Forestry Research Station, Mettupalayam, A major construction i.e. building for Microbiology, Isotope lab, Modernising hostel kitchen and dining hall, Artificial Insemination Building at Madras Veterinary College, Madras, Lab for Cattle and sheep and flooring and drainage in the Piggery shed at Livestock Research Station, Kattupakkam Poultry houses for accommodating 15,000 birds and over head tank at Poultry Research Station, Teynampet, Main School Building I and II Phase, Rat Proof Godown and fish tank at Krishi Vigyan Kendra, Pondicherry, Dinning Hall and Hostel Block I and II Phase and First floor over, Lab, weir and vehicle shed and formation of road and cement godown at Fisheries College, Tuticorin, Pumping Scheme in High Level Kattalai Canal, Poultry House and Rat Proof Godown at Kumaraperumal Farm Science Centre, Trichy, Water Tank and repair works at Horticultural Research Station, Thadiyankudisai and Thrashing floor, Trough for sprinkler irrigation and other repair works at Horticultural Research Station, Kodaikanal.

3. TEACHING

FACULTY OF AGRICULTURE

(A) AGRICULTURAL COLLEGE AND RESEARCH INSTITUTE COIMBATORE

The Agricultural College and Research Institute, Coimbatore continued to offer the B.Sc.(Ag.), B.Sc.(Hort.), M.Sc.(Ag.) and Ph.D. courses under trimester system. During the academic year 1979-80 Dr. P. Chandrasekharan held the post of Dean, Agricultural College and Research Institute, Coimbatore upto 14.2.80. Dr. V. N. Madhava Rao took over charge on 15.2.80 F.N. A Dean for Post-Graduate studies was appointed and Dr. C. V. Govindaswamy took over charge on 1.9.79. The Department of Agricultural Botany was upgraded to School of Genetics headed by a Director from 1.3.80. Dr. P. V. Marappan assumed the Office of Director, School of Genetics on 1.3.80.

1. **Admission :** The College reopened on 13.8.79 for the II, III and final B.Sc.(Ag.) classes. This year B.Sc.(Ag.) classes commenced on 26.10.79.

The number of students admitted in the I, II, III and IV year B.Sc. (Ag.) were 122, 122, 126 and 137, respectively. The post graduate classes consisted of the following:

I M.Sc.(Ag.) full time 102, part time 1, II M.Sc.(Ag.) full time 106, part time 7, Ph.D. full time 48 and part time '56.

2. **Centre of Advanced Studies in Agricultural Microbiology:** The Centre of Advanced Studies in Agricultural Microbiology was implemented with the financial assistance from UNDP/FAO/ICAR at the Department of Agricultural Microbiology from September 26, 1979. Besides imparting posr-graduate education, the Advanced Centre focuses its attention on research programmes such as biological nitrogen fixation (both symbiotic and non-symbiotic), degradation of organic materials and pesticides, biogas technology utilizing agricultural wastes, microbial degradation of industrial pollutants, microbiology of fishes grown in sewage-fed ponds and microbiology of certain food preparations.

3. **Educational Tour :** The final B Sc.(Ag.) students were on an All India educational tour for the first time from 27.11.79 to 19.12.79 when they visited various agricultural universities and agricultural research institutions in Madras, Calcutta, Delhi, Ludhiana, Bombay and Bangalore

The third year B.Sc.(Ag.) students were on educational tour to Agricultural Research Stations and Agricultural Farms in the Nilgiris, Yercaud, Mettur, Mecheri, Salem, Kaveripattinam, Hosur etc., from 7.4.80 to 13.4.80.

The second B.Sc.(Ag.) students went on an educational tour to Agricultural Research Stations in Kodaikanal and Madurai in two batches on 26.1.80 - 27.1.80 and 15.3.80 - 16.3.80.

4. **Scholarships:** The details of the scholarships awarded during 1979 - 80 are furnished below :

Name of scholarship	Amount of scholarship	No. of scholarships awarded to		Total
		U. G.	P.G.	
Backward Classes Scholarship	Rs. 917.50 for U.G. Rs. 1224.50 for P.G.	155	31	186
Scheduled Caste Scholarship	Rs. 1623/- for U.G. Rs. 1672/- for P.G.	41	7	48
Backward Classes Loan Scholarship	Rs. 500/-	6	—	6
Scheduled Caste Loan Scholarship	Rs. 970/- for U.G. Rs. 1150/- for P.G.	26	3	29
National Merit Scholarship	Rs. 1475/-	18	—	18
National Loan Scholarship	Rs. 670/- for U.G. Rs. 1020/- for P.G.	13	3	16
National Foundation for Teachers' Welfare Scholarship	Rs. 500/-	3	—	3
NCERT GOI Scholarship	Rs. 1650/-	1	—	1
Scholarship from Ex-Servicemen Amalgamated Funds	Rs. 954/-	6	—	6
EID Parry Merit Scholarship	Rs. 1200/-	3	—	3
Lodge Concord G. K. Devarajulu Educational Scholarship	Rs. 1035/-	3	—	3
Pondicherry post-matric Scholarship	Rs. 1310/-	10	—	10
Educational concessions to the children of deceased Govt. Servants	Rs. 2932/-	1	—	1
University Merit Scholarship	Rs. 65/- p.m.	7	—	7
	Rs. 100/- p.m.	21	—	21
	Rs. 200/- p.m.	—	10	10
	Rs. 250/- p.m.	—	1	1
ICAR Junior Fellowship	Rs. 300/- p.m.	—	72	72
IACR Senior Fellowship	Rs. 400/- p.m.	—	3	3
CSIR, New Delhi Fellowship	Rs. 400/- p.m.	—	1	1
Scholarship from Atomic Energy, Bombay	Rs. 400/- p.m.	—	1	1
IOB Scholarship	Rs. 300/- p.m.	—	1	1
Bank of Baroda Scholarship	Rs. 300/- p.m.	—	2	2
Financial assistance from U.G.C. Grant	Rs. 2500/-	—	1	1
Stipend from Director of Agriculture, Nagaland	Rs. 500/- p.m.	—	1	1
ICAR Merit-cum-Means Scholarships	Rs. 1200/-	50*	—	50

Scholarship for 12 first B.Sc.(Ag.) and 3 B.Sc (Hort.) students are yet to be received for the Academic year 1979-80.

5 **Students' Hostel :** Dr. T. S. Muthukrishnan, Professor of Biology, Faculty of Basic Sciences and Humanities continued to be the Warden during the year. Thiru C. M. Bhakthavatsalu, Dr. M. Balasubramanian and Dr. K.M. Ramanathan were Deputy Wardens in charge of administration & accounts, stores and messes, respectively. Dr. A. Balasubramanian, Deputy Warden, Canteen relinquished the post on 13.7.79 consequent on his transfer to Madurai. Mr. Koteeswaran and Mr. K. Karunanidhi of the Faculty of Agricultural Engineering were Deputy Warden and Additional Deputy Warden, respectively of the Engineering Hostel. Miss R. Kasthuri officiated as Deputy Warden, Women's Hostel till January 31, 1980. Owing to increased admission of women students to the first year under-graduate classes two more quarters were requisitioned to accomodate them. A new Women's Hostel was under construction. An additional Deputy Warden was also appointed and Mrs. Balasaraswathi joined the post on 26.10.79.

There were 1110 students in the hostel in the beginning of the year and 958 at the close. The strength of the women students in the hostel rose from 36 to 76.

The I year B.Sc. (Ag.) and II B.Sc. (Hort.) students were accomodated in the Old Hostel, II year B.Sc. (Ag.) and B.Sc. (Hort.) in the Old Hostel and PPC hostel, III year B.Sc. (Ag.) and B.Sc. (Hort.) were accomodated in PPC Hostel, Tamilagam (New Hostel) and final B.Sc. (Ag.) and B.Sc (Hort.) students in Tamilagam (New Hostel), Post-graduate students were accomodated in the Tamilagam and P.G. Hostel. All the Engineering students were accomodated in the Engineering Hostel. Lady students were accomodated in 3 bungalows.

Messes : Seven messes were being run for the inmates apart from the ladies and engineering hostels. A 'contract mess' at a fixed rate of Rs. 4.25 per day for vegetarians and Rs. 5.00 per day for non-vegetarians was run to provide cheaper food for those who need the amenity. Senior P.G. students were running their messes as a measure of involving the students' management of their messes.

Health : The University Medical Officer attended to the needs of the sick students in the medical room of the hostel office between 5 and 6 p.m. every day.

6. **Students' Club :** Thiruvalargal K. Shanmugasundaram, IV B.Sc. (Ag.), K. Kalaichelvan IV B.Sc. (Agri), I. Muthusamy, V B.E. (Agri), B. Balaji Srinivasan, IV B.Sc.(Hort.) were elected as Club Secretary, Games Secretary and Joint Club Secretaries, respectively for the year 1979-80.

The Independence Day was celebrated on August 15, 1979. Dr. P. Chandrasekharan, Dean (Agri) took the salute of the N.C.C. and delivered the Independence Day message.

7. **Games and Sports :** The Inter-Collegiate Foot-ball tournament was conducted from 29.8 79 to 3.9.79 and the P.S.G. College of Technology won the trophy.

The Inter collegiate sports meet for all colleges in Coimbatore was held on September 14 and 15, 1979 at the Main campus grounds. Dr. C.V. Govindaswamy, Registrar took the salute and declared the sports meet open on 14th September. Thiru B P. Nailwal, I.P.S., Superintendent of Police, Coimbatore (Urban) presided over the function. Mrs. Usha Nailwal distributed the awards to the winners.

The Orientation Day for freshers was celebrated on 31.10.79. The inaugural function of the Students' Club activities for the year 1979-80 of the Tamil Nadu Agricultural University was held on November 16, 1979. Hon'ble Thiru P. Kulandaivelu, Minister for Agriculture, Government of Tamil Nadu and Pro-Chancellor of the University delivered the inaugural address. Thiru A. Venkataraman, I.A.S , Vice Chancellor presided.

Inter-University Tournaments : The Tamil Nadu Agricultural University participated in the Volley ball, Foot-ball, Basket-ball, Hockey and Ball Badminton tournaments of the Inter-University tournaments. The University Basket-ball team beat Annamalai University and Andhra University and reached quarter final stage. The team lost to Bangalore University narrowly. Thiru K. Senthilvadivelu, II B Sc. (Ag.) attained the honour as Top individual scorer of the Inter-University. He was one among the ninety probables selected for Indian National Basket ball team.

The Republic Day was celebrated on 26.1.80. Dr. C.V. Govindaswamy, Registrar hoisted the National Flag and delivered the Republic day message.

The P. Kalaimani Foot Ball tournament was conducted from 3rd March, 80, for colleges of Coimbatore district. The TNAU Main campus team beat P.S.G. College of Technology by 5 goals to 'nil' on 6.3.80 and claimed the trophy. Dr. V.N. Madhava Rao, Dean (Agri) presided over the function and distributed the awards.

The competitions for the Best Student Athlete and Best Sportswoman were held on 24.3.80 at the main campus grounds. Thiru C. Balamurugan, IV B.Sc.(Ag) and Selvi Mary Amrtha Bai, II B Sc.(Ag.) were adjudged as Best Student Athlete and Best Sportswoman respectively for the year 1979-80.

The "Vice-Chancellor Hockey Trophy" tournament was conducted from 23.3.80 to 29.3.80. The Palani Andavar Mills Hockey Club claimed the trophy by beating P.S.G. College of Technology on 29.3 80. Thiru P. K. Doraiswamy, I.A.S., Chairman-cum Managing Director, National Textiles Corporation presided

over the function. Mrs. Uma Doraiswamy distributed the awards to the winners and runners-up of the tournament.

8. **Debating Society :** The Debating Society participated in the Inter-Collegiate debating competition held at Santhalinga Adigalar Tamil College, Perur and Thiru M.R. Thangasamy, III B.Sc.(Ag.) won the second prize on 2.3.80. Thiru Ranganathan, III B.Sc.(Ag.) got a cash award of Rs. 50/- in the Arya Vysya Samajam's debating competitions held on 9.3.80. Thiru Ramesh Raja, IV B.Sc. (Hort.) participated in the Inter-Collegiate debating competition held at Government College of Technology on 2.4.80 and won the second prize.

9. **Dramatic Society :** The Dramatic Society participated in the Inter-Collegiate dramatic competition held at P.S.G. College of Technology on 24.2.80 and won the following prizes :

Best Director	: D. Srinivasavaradhan, II M.Sc. (Ag.)
Best Comedian	: G. Sivanadhan, III B.E.(Ag.)
Consolation prize for supporting actor	: Selvaraj, II B.Sc.(Ag.)

The society participated in the 'Leo Club Cultural Programme' held at Government College of Technology on 16.3.80 and won the following prizes :

Best overall performance	: Rolling cup
Best Singer	: S. Tamilmani, IV B.Sc.(Ag.)
Best Guitarist	: Mohan Abraham Ross, IV B.E.(Ag.)
Best Mimicry	: G. Sivanadhan, III B.E.(Ag.)

The society participated in the 'Youth Festival' held at Government College of Technology on 23.3.80 and won the following prizes :

Best Drama	: Suriya Kiraganam
Best Actor	: D. Murugesan
Best Comedian	: P. Jeevandam
Best Mono acting	: G. Sivanadhan, III B.E. (Ag.)
'Second Best Orchestra'	

In connection with the Rajaji Centenary celebrations, The Rajaji Centenary Committee, Bombay offered to present a Trophy and cash award for an elocution competition. This was held on 30.1.80. Dr. J. Thuljaram Rao, Zonal Co-ordinator, Lab to Land Programme was the Chief Guest and Dr. P. Chandrasekharan, Dean (PG Studies) presided over the function. The students from the constitutent colleges of Tamil Nadu Agricultural University participated. The College of Agricultural Engineering, Coimbatore won the Trophy/Shield. A cash award of Rs. 250/-was given to Thiru K. Ranganathan of College of Agricultural

Engineering. Thiru C. Ponniah, Agricultural College and Research Institute, Madurai won the second prize of Rs. 150/-. The third prize of Rs. 100/- was awarded to Thiru P.T. Kalaiselvan of Agricultural College and Research Institute, Coimbatore.

10. **National Service Scheme :** The allocated student strength of 100 students has been enrolled. Regular activities during weekend holidays and other holidays and the special camping activities were carried out according to the plan. The main thrust was on agricultural programmes such as demonstration of improved practices in agriculture, pest control, rat eradication programme, soil analysis, seed treatment measures, preparation of compost, repairs of sprayers and dusters, animal health programme etc. One special camp was also conducted at Chinnathadagam from 27.11.79 to 2.12.80. Sixtysix student volunteers and teachers participated in the special camping programme at Chinnathadagam. Three one-day camps were also conducted at Nanjundapuram, Somanthuraichittur and Chinnathadagam. The students also participated in police-student community service organised by the Police Department and were awarded certificates. The student volunteers took part in various other social service activities such as adult education traffic control, laying of roads, cleanliness drive, temple cleaning, cleaning of overhead tank etc. A total 10123 man hours were spent on various activities.

11. **National Cadet Corps :** Sgt. A. Ashok Kumar, IV B.Sc.(Ag.), Sgt. R. Visvanathan, III B E.(Ag.), Sgt. S. Vellaichamy, III B.Sc. (Ag.), Cpl. S. Rajagopal III B.Sc.(Ag.) and L/Cpl. S. Panchalingam, III B.Sc.(Hort.) were selected for attending 20 days camp from 11th June 79 to 1st July 79 at Madras Regimental Centre, Wellington. They were given training in field craft, Bauyonet fighting, Map reading, Obstacle course etc.

Cpl. P.P. Thangavelu, III B.E.(Ag.) of this unit attended water skiing course at Srinagar for a period of 14 days from 12.7.79 to 25.7.79.

Cadet Under Officer A. Ashok Kumar, IV B Sc.(Ag.) of this unit won the Burthwan Trophy of the Inter-unit shooting competition held at Madukkarai on 23rd August 79. This is the third time in succession, he won this credit to TNAU.

Thirty NCC Cadets of this unit along with NCC Officer attended the combined Annual Training camp with agricultural bias held at R.S. Puram Higher Secondary School for boys from 24th December, 79 to 4th January, 80. Due weightage was given for various Agricultural programmes like (a) Kitchen gardening (b) Bio-gas plants and farm impliments etc. The training programme was inagurated by Dr. P. Chandrasekharan, Dean, Faculty of Agriculture.

A cup was awarded for our NCC Unit for the All Round Best in Team work and co-ordination at the Veledictory function presided over by the Vice-Chancellor, TNAU

Three rehearsal parades were conducted for the VIII Convocation Guard of Honour on the 6th, 7th and 8th of March, 1980.

Fifty cadets and one cadet Senior Under Officer presented a Guard of Honour to Shri Prabhudas B. Patwari, Chancellor of Tamil Nadu Agricultural University and Governor of Tamil Nadu during the VIII Convocation on 9th March, 1980.

Twelve cadets of this unit appeared for 'C' certificate examination on 27.2.80 and twentysix cadets for 'B' certificate examination on 13.3.80. The results of the certificate examinations are awaited.

Dr. P. Rajasekaran, Coy. Commander of this University attended an 'Officers' Refresher Course' at NCC Officers Training School, Kamptee, Nagpur between 12.2.80 and 11.3.80.

12. **Library :** The library accessioned 4299 books and back volumes of periodicals during this year. As many as 425 bulletins, 84 annual reports, 68 M.Sc. theses and 4 Ph.D. theses were also added to the library.

Library Administration : Library Committee met eleven times during the year and discussed important problems about the development of the Library.

Inter-Library Co-operation : The library arranged for loan publications from other Agricultural University libraries, Research Institute libraries and other Technical libraries in India and abroad on reciprocal basis.

Library Week : During November 1979, the Library Week was celebrated and a book exhibition was conducted under the auspices of the National Library Week when an oratorial contest in Tamil and a Kavi Arangam were conducted among students.

Solis 1979 : During the Library Week, the library conducted a seminar on Library Information Service. Thirty librarians from Coimbatore, Periyar and the Nilgiris districts participated and presented ten papers for discussion.

Classification and Cataloguing : During this year, 3328 documents were classified, catalogued and arranged in the stack of the library. Shelf Register cards, subject cards, author cards and book and tracing cards were prepared. Totally, 20471 index cards were prepared and 11845 indexing cards were filled into the card cabinet.

Periodicals : The library received 1034 periodicals during the year under report. Out of those, 783 were subscribed, 20 were received on exchange basis, 182 were received as gratis and the rest of 50 were news letters. Sixty-three journals which had been recommended by the various departments were

approved by the Library Committee for subscribing during the year 1979-80; 6728 issues of the periodicals were also added in the periodical section.

Binding : The binding section of the library had bound 1407 periodicals (leather binding) and 265 books (calico binding).

Visitors : A total number of 50078 readers consulted 391652 books and periodicals during the year; 59058 books had been issued on loan to the members. The Research Stations were served by 165 books for their reference.

13. **Earn While You Learn Scheme :** Under 'Earn While You Learn' scheme post-graduate students were engaged to attend the library work such as cataloguing, arrangement of books and periodicals, preparation of indexing cards, etc. The students were given intensive training to write the index cards on the basis of the classified catalogue code. The students who took part in the scheme were paid Rs. 4677/- as honorarium for their services.

Reprographic service was offered to Agricultural Institutions and 10433 pages were Xeroxed. The library has received a new automatic Xerox Machine viz., AGFA-GEVAFAX-X21U as a gift from UNESCO, Paris.

(B) AGRICULTURAL COLLEGE AND RESEARCH INSTITUTE MADURAI

The Agricultural College and Research Institute, Madurai is engaged in teaching, research and extension education. The institution offers B.Sc.(Ag.), and M.Sc.(Ag.) courses under the trimester system of education.

Dr. K.K. Krishnamoorthy continued to be the Dean of the Institution during the period under report. There are ten Departments under the Faculty of Agriculture and three under Faculty of Basic Sciences and Humanities. Each Department is headed by a Professor or Associate Professor except the Department of Languages. The Dean is assisted by a Junior Accounts Officer in the administration and a Warden and two Deputy Wardens in the hostel administration. Besides this, a Junior Accounts Officer exclusively for the hostel has been appointed to assist the Warden.

1. **Admission :** The number of students on roll during 1979-80 is as follows : I. B.F.Sc. 19; I B.Sc.(Ag.) 90; II B.Sc.(Ag.) 74; III B.Sc.(Ag.) 88; IV B.Sc.(Ag.) 90; I M.Sc.(Ag.) 46; and II M.Sc.(Ag.) 31. M.Sc.(Ag.) Programme in Ag. Extension and Ag. Economics have been started from the year 1979-80 at this Campus.

2. **Scholarships :** The following scholarships were being availed of by the students during the year.

	Name of the Scholarship	Under graduate	Post graduate	Total
1	B.C.DNT	8	—	8
2	S.C. Scholarships	46	2	48
3	ICAR Merit	17	—	17
4	B.C. Scholarship	122	12	134
5	B.C. Loan Scholarship	1	—	1
6	National Merit	8	—	8
7	National Loan	19	5	24
8	ICAR Junior Fellowships	—	17	17
9	Agri Merit	—	2	2
10	Pondicherry State Scholarship	—	1	1
11	Aspee Foundation	—	1	1

3. **Educational Tours :** The III year students were taken on educational tours to the Agricultural Experimental stations at Aduthurai, Cuddalore and Annamalai University and Coimbatore.

The final year B.Sc.(Ag.) students numbering seventy nine along with three staff members were on All India Educational Tour from 16.2.80 to 9.3.80. The students visited ICRISAT, Andhra Pradesh Agricultural University, Central Plant Protection Training Institute at Hyderabad, Baba Atomic Research Centre and Aarey Milk Project at Bombay, Nuclear Research Laboratory and Indian Agricultural Research Institute at New Delhi, Punjab Agricultural University at Ludhiyana, Jute Research lustitute, Central Inland Fisheries Research Institute at Calcutta, Central Rice Research Institute at Cuttack, Orissa Agricultural University at Bubaneswar and Agri-Horticultural Society at Madras.

4. **Students Hostel :** Dr. V.D. Guruswamy Raja, Professor and Head, Department of Agrl. Botany was the Warden assisted by two Deputy Wardens namely Dr. S. Purushothaman, Asst. Professor of Agronomy and Dr. S. Uthamasamy, Asst. Professor of Agrl. Entomology. There were 384 students in the hostel. Adequate medical facilities were provided by a part-time Medical Officer.

5. **Earn while you learn Scheme :** About 6 students in the third B.Sc.(Ag.) Class were benefited by this scheme on poultry keeping. The cost of the Chicks, feed and labour were met by these students. Veterinary facilities were provided free of cost. The profit was shared by the students recovering the cost after sale in 12 weeks.

7. **National Service Scheme :** The National Service Scheme has been functioning from 11.2.76 in the Agricultural College and Research Institute, Madurai. Dr. G. Perumal, Associate Professor of Agricultural Extension was working as Programme Officer of the Scheme till 15.8.79 and Thiru M. Peer Mohamed, Assistant Professor of Soil Science and Agrl. Chemistry assumed

charge as the N.S.S. programme Officer on 16.8.79 and has been working during the period under report.

The strength of the N.S.S. Unit wss 130. Right from the start of the academic year, the student volunteers showed great interest in the welfare activities of the villages.

The N.S.S. volunteers attended the following services during the period under report. Adult Education programme (Literary and functional); Agricultural programme (Plant protection, and Rat Eradication etc.); Traffic control and road sense; Socio-economic survey; Teaching of modern agricultural Technique to Higher Secondary School students; Laying of kitchen-gardens; Small Savings-Propaganda work; Health services; Family Welfare advisory work; Nutrition for children; Blood donation activities; Youth against dirt and disease; Preservation of monuments; Keep the Campus clean programme; Flood relief work (Distribution of cloths); Treating of sick animals; Tree planting and maintenance; Strengthening of tank bunds etc.; Temple cleaning work; Free eye-camp activities; Children's day activities; Conducting of Night School; Conducting of Day Schools and Arrangements for supply of represhnuts, quene regulation and guidance work during College functions.

The National Service Scheme organised a special rural reconstruction Camp at Arumbanur Village of Madurai East Panchayat Union for 10 days from 20th to 29th November, 1979. Fifty two student volunteers participated in this camp apart from 5 local youths.

The camp was inaugurated on 21st November by Dr. K.K. Krishnamoorthy, Dean, Agricultural College and Research Institute, Madurai under the presidentship of Mr. P. Arunachalam, President, Arumbanur Co-operative Society.

The valedictory function of the Agricultural College National Service Scheme Rural reconstruction camp was held on 29.11.79 at Arumbanur. Dr. K.K. Krishnamoorthy, Dean, Agricultural College. presided and Mr. Sethuramalinga-pandian, District Development Officer delivered the valedictory address and distributed the certificates to the participants.

The following services were rendered during the Rural Reconstruction Camp :

1. One free eye camp was orgahised with the co-operation of M/s Arvind Eye Hospital, Madurai and more than 150 poor people were treated, of which a few cases were selected for free eye operation.

2. The student volunteers deepened the tank of the village and strengthend the bunds. They also strengthened the bunds of the tank in a near-by village, Senkulam. The students also repaired the village approach roads and helped the construction of huts for a few poor people who lost their huts during the recent rains.

3. With the cooperation of Madurai, Nutrition Rehabilitation Centre mothers were explained through posters and filmshow as to how to provide nutritional food to their children and the ways of preventing deficiency diseases.

4. The students undertopk advisory work on mosquito cradication, prohibition, keeping the surroundings clean, general health, family welfare, small savings etc. Films on rat eradication, gobar gas plant, pesticides, irrigation were also screened for the benefit of the farmers.

5. An 'Agricultural Day' was arranged with the experts of the Agricultural College and the farmers.

6. The N.S.S. students collected old clothes from the families of the staff of Agricultural College and distributed them to more than 400 poor people who were affected by rains and floods.

7. Major-tree-planting work was also carried out. Students planted more than 100 tamarind, neem, silk cotton tree seedlings on the tank bunds. They laid model kitchen gardens at the backyards of the houses in the villages and distributed papaya, curry leaf seedlings and vegetable seeds like brinjal, bhendi, tomato etc. free.of cost.

8. A 'Veterinary Care Day' was also organised and doctors and students from the Agricultural College treated more than 100 heads of sick cattle and distributed the seedlings of N.B. 2 grass for cultivation to meet their fodder requirements.

9. The volunteers conducted night school for the elementary school children daily and about 60 boys and girls were benifited by this.

10. The N.S.S. organised a 'Childrens Day' in which sports and a debating competition were arranged for the children.

11. One socio economic survey of the village was also conducted.

12. Two persons were given training in Tractor driving by the Engineering Department of the College.

The programme Officer and student Secretary helped the conduct of special camps conducted by other city colleges by way of giving special lectures and technical guidance.

7. **Students Achievements in Extra Curricular Activities :** The following students have been selected to represent Tamil Nadu Agricultural University Teams in the Inter University Tournaments in South India.

Foot Ball

1. K.M. Thilakar, IV year 2. P. Rajan, III year	South Zone Inter-University Foot Ball tournaments held at Venkateswara University, Tirupathi.

Volley Ball

1. N. Venkatesan, III year 2. V. Sivanmoorthy II year 3. M. Manidurai, I P.G.	South Zone Inter-University Volley ball tournaments held at Kerala Agricultural University, Trichur.

Hockey

1. M. Manimaran, IV year 2. A. Durgairajan, I P.G. 3. P. Rajan, III year	South Zone Inter-University Hockey tournaments held at Annamalai University

Students participated in Vaigai Atheletic Open Cross Country race competitions and obtained certificates.

Students participated in Madurai District, Hockey, Volley ball and Cricket league Tournaments. The Cricket team won Arasaradi C.C. and star C.C. in Cricket league tournaments. Students participated in Kalaithanthai memorial tournaments.

Under the auspices of Hiking society students went to Courtallam by cycle.

Students participated in Open Athletic meet conducted by Vaigai Athletic Club, Madurai. Thiru A. Bryn Green Anand won the Second place in High Jump and third place in polevault. Mr. V. Sivanmoorthy won the third place in shotput. College Team won the second plance in 4 x 100 m relay.

Students participated in all the debating, music, oratorial contest, essay competition and quiz etc, conducted by Rotary club, Rotract Club, Madurai Jaycees and other Inter Collegiate competitions.

College debating team was adjudged as the best in the Inter-Collegiate competitions conducted by Madurai Rotary Club (West). The participants were Messers S. Rajan Babu, Ponniah and Desigavinayagam, all final year B.Sc. (Ag.) students.

Thiruvalargal S. Rajanbabu final B.Sc.(Ag.) and John Britto II PG were awarded First Prize (team) and S. Rajan Babu secured individual III prize in Just a minute programme conducted by Madurai Pandian Jaycees.

Mr. S. Rajan Babu IV year won the III prize in the Oratorical contest and debating contest conducted by Rotary Club of West at Senthamil College, Madurai.

Mr. R. Chandrasekaran (Secretary orchestra) IV year won the First Prize in Instrumental and III prize in Orchestra in the Inter-Collegiate Music Competitions conducted by Madurai Pandian Jaycees.

Mr. N. Balaji III year and John Britto II PG won the III prizes and College team won I prize in verso writing competition conducted by Madurai Jaycees.

Mr. Devanathan I M.Sc. (Ag.) won the II prize in drawing Competition conducted by Madurai Jaycees.

Thiruvalargal A. Srikumar IV B.Sc. (Ag.), K. Balavinayagam IV year and A. Basheer IV B.Sc.(Ag.) won the III Prize in quiz competition conducted by Madurai Rotary club.

Mr. C. Ponniah IV year won the II prize in Rajaji Centenary Debating competition (in Tamil) conducted by Tamil Nadu Agiicultural University, Coimbatore.

Our students participated in Ilayabaratham, a variety programme arranged by All India Radio, Trichirapalli on 10.2.80

8. **National Cadet Corps :** The National Cadet Corps D/12 Company of of this College was attached to the 7 (Tamil Nadu) Battalian NCC, Madurai. Forty five cadets were recruited from first, second and third B.Sc.(Ag.) classes. The Cadets were given training in foot drill, arms drill weapon training, field craft, map reading, first aid and Civil defence for 40 parades of 2 hours duration each. Cpl. C. Kalki of III B.Sc.(Ag.) attended Army attachment training at MRC Wellington from 1 June '79 to 10 July '79. Twelve cadets and NCC Officer attended the combined Annual Training Camp conducted at Thinthapathi Higher Secondary School, Ambasamudram from 22 December '79 to 2 January '80. 2/Lient S. Subramanian, NCC Officer attended Refresher Course NCC. OTS Kamptee (Nagpur) from 14 May 1979 to 12 June 1979. The Republic Day parade was conducted on 26 January '80 and Dr. K.K. Krishnamoorthy, Dean, took the salute, hoisted the National Flag and distributed the Certificates.

FACULTY OF HORTICUTURE

The Faculty of Horticulture continued to offer B.Sc.(Hort.) degree course, besides courses in Horticulture to B.Sc.(Ag.), and B.E.(Ag.) degree classes. Dr. C.R. Muthukrishnan continued to be the Dean of Faculty for the academic year 1979-80. This Faculty also offered courses at post-graduate level for M.Sc. and Ph.D. degree in different disciplines of Horticulture.

1. **Admission :** Forty students were admitted to the I B.Sc. (Hort.) course. Twelve students for M. Sc. in Horticulture and Eight students for Ph.D. degree programme were admitted during this year. There were 17 M.Sc. (Hort.) and 18 Ph.D. senior students. The second, third and final B.Sc.(Hort.) courses commenced on 13 August 1979. The strength of II, III and IV B.Sc.(Hort.) classes were 20, 13 and 16, respectively. The first B.Sc.(Hort.) course for under-graduate commenced on 5 September, 1979.

2. **Educational Tours:** The Final B.Sc.(Hort.) students went on an All India educational tour from 15.2.80 to 8.3.80 to Bangalore, Madras, Bombay, Agra, Delhi, Ludhiana and Hyderabad and visited the Research Stations, Agricultural Universities and gardens. They also went on tour from 18.3.80 to 25.3.80 to Kodaikanal, Courtallam, Kanyakumari, Kulasekaram to study the plantation crops like Wattle, Eucalyptus. Cinchona, Cashew, Rubber and oil palm.

The third year B.Sc.(Hort.) stupents went on Pomology optional tour.

The post-graduate students (Ph.D.) went on tour in co nnection with the course-Banana culture and Commercial Floriculture-to Dindigul, Thadiyankudisai, Madurai, Trichy, Aduthurai, Salem, Yercaud and Krishnagiri from 2.11.79 to 8.11.79.

3. (i) **Training Programme:** The third year B. Sc. (Hort.) students were given a practical training in the coffee and tea estates for a period of one month during February, March 1980 at Yercaud, UPASI (Nilgiris) and Anamalai.

(ii) **Earn while you learn:** During the year 1979-80 under the earn while you learn programme in vegetable culture, twelve students from II B.Sc.(Ag.) were selected. They raised onion crop. The net profit accrued and shared by each student ranged from Rs. 15.50 to Rs. 38.86.

4. **Scholarships:** The following scholarships were availed of by the students of the Horticulture Faculty.

Name of Scholarship	Under-graduate	Post-graduate
Backward classes scholarship	—	—
Scheduled Caste scholarship	—	—
National loan scholarship	1	—
Agricultural Merit scholarship	4	—
ICAR Fellowship	—	1
ICAR Merit Scholarship	3	—
Totol	8	1

Special Lectures: The following special lectures were arranged during the year 1979-80 for the benefit of students, and staff members of the faculty.

1. Dr. A. Abdul Ravoof, University of Malaysia delivered a special lecture on plantation crops in Malaysia on 18.5.79.
2. Dr. C. Srinivasan, University of Sydney delivered a dpecial lecture on "Physiology of flowering in grapes" on 4.12.79.
3. Dr. Basilio Donini, Radio Biologist from Division of Applications, Radiozons (NEN, Italy delivered a special lecture on "Application of mutation Breeding in Agricultural Crops".

4. Mr. S. Shanmugasundaram, Asian Vegetable Research Centre, Taiwan, China, delivered a special lecture on "Recent trends of research in Soybean" on 20.8.80.

FACULTY OF AGRICULTURAL ENGINEERING

The College of Agricultural Engineering at Coimbatore offers a five year degree course leading to B.E.(Ag) degree and two year Post graduate course leading to M.E.(Ag.) in Soil and Water Conservation Engineering and Farm Power and Machinery under trimester system.

1. **Admission :** Forty nine students were admitted to the I B.E.(Ag.) course and 21 students were admitted to the M.E.(Ag.) course in Soil and Water Conservation Engineering and Farm Power and Machinery. The first year courses for under-graduate and post-graduate commenced on 26.10.79 and 5.9.79, respectively. The II. III, IV, V B.E.(Ag.) and II M.E.(Ag.) course commenced on 13.8.79. The strength of the under-graduate and post-graduate students of the corresponding classes were 45, 44, 49, 51 and 20, respectively.

2. **Training Programme :** The IVth year B.E.(Ag.) students were given practical training during the summer vacation for a period of 20 days from 18th June to 9th July, 1979 at different public sector units like State Soil Conservation, G.S. Tractor workshop, Coimbatore, LCT, Coimbatore, Revathi CP Equipment Ltd., Coimbatore and Velumani Engineering Industry, Coimbatore.

3. **Educational Tour :** The final B.E. (Ag) students were taken on All India study tour for three weeks from 15.2.80 to 8.3.80 and they visited the following places :

National Dairy Research Institute M/s. Vicon Ltd. Visweswaraya Technical Institute	Bangalore
Indian Institute of Technology M/s. Voltas Ltd. M/s. American Springs	Bombay
Indian Agricultural Research Institute Water Technology Centre National Physical Laboratory Hansha Tractors Ltd.	Delhi
Ludhiana Agrl. University Standard Agrl. Engineering Company M/s. Sigma Steel Industries	Ludhiana
ICRISAT Andrapradesh Agrl. University Hyderabad Farm Mech /Krishi Engines	Hydrabad

The IVth B.E.(Ag) students were on study tour from 27.3.80 to 3.4.80 and they visited the following places in Tamil Nadu during their visit : State Farm Corporation, Water Management Works, J Farm at Chengam, Institute of Hydraulics and Hydrology, Agro Industrial Development Corporation at Madras, Neyveli State farm at Neyveli, Modern Rice Mill, Paddy Processing Centre, Agrl. Implements workshop at Thiruvarur, Wind Swept Areas and Modernisation works at Bodi, SPIC and Fisheries College at Tuticorin.

4. **Scholarships** : The details of scholarships awarded for the year 1979 - 80 were as follows :

Scholarship	Under graduate	Post graduate
National Merit Scholarship	11	—
National Loan Scholarship	5	—
Backward Class Scholarship	53	—
Scheduled Caste Scholarship	22	—
Scheduled Caste Loan Scholarship	19	—
Pondicherry State Scholarship	2	—
TNAU Merit Scholarship	18	2
ICAR Merit Scholarship	14	—
ICAR Junior Fellowship	—	1
Teachers Schclarship	1	—
Ex-Servicemen Scholarship	3	—
Sikkim Government Stipend	1	—
Nagaland Government Stipend	1	—
Total	150	3

5. **National Service Scheme** : A total of 82 students were admitted to the National Service Scheme Programme during the academic year. The following items of works were attended to by the volunteers Eradication of weeds and cleansing of Harijan colony, desilting and deepening of a pond, teaching I to V standard children, construction of drainage channel below the taps, repairing and widening of roads, repairing the drainage of a water tank, cleaning the surroundings of a temple at Vedapatty; helping the local police in implementing crowd control and renovation of an old temple at Nanjundapuram.

FACULTY OF BASIC SCIENCES AND HUMANITIES

The Faculty of Basic Sciences and Humanities, Coimbatore offered courses in the Basic Sciences and Humanities to the first year students of B.Sc (Ag.), B.Sc. (Hort.) and B.E.(Ag) courses and Post-graduate courses leading to M.Sc. and Ph.D. in Environmental Biology and Plant Physiology.

Dr. S.R. Sree Rangaswamy continued to be the Dean. The Faculty has 7 departments engaged in teaching and research activities in close collaboration with the Faculties of Agriculture, Horticulture and Agricultural Engineering

Five students were admitted to M.Sc. (Environmental Biology), five to M.Sc. (Plant Physiology) and three to Ph.D. (Plant Physiology) during the academic year 1979-80. Regular classes commenced from 5.9.79 for the first year M.Sc. and Ph.D. students and from 13.8.79 for the second yaar M.Sc. and Ph.D. students.

CENTRE FOR AGRICULTURAL AND RURAL DEVELOPMENT STUDIES

The Centre for Agricultural and Rural Development Studies (CARDS) was established at the Tamil Nadu Agricultural University, Coimbatore with effect from August 1, 1979. The CARDS consists of two units viz., Department of Agricultural Economics and Department of Agricultural Extension and Rural Sociology. Responding to the agro-economic changes in the rural seenario and its ongoing and upcoming problems, the Centre focuses its research efforts on cost and returns of crop production; consumption behaviour of rural households, economics of inland pisciculture, farm financial management including efficiency in use of farm credit; impact of long term credit and economics of mixed farming and marketing of vegetables.

FACULTY OF VETERINARY AND ANIMAL SCIENCES

The Veterinary College, Madras is engaged in teaching, research and extension education. It has become a constituent unit of the Tamil Nadu Agricultural University from December 1, 1976. The College offers B.V.Sc. and Ph.D. Degree Courses.

Dr. V.M. Ramaswamy, continues to be the Dean of the Madras Veterinary College. The Vice-President of the Students' Association and the Sports Secretary assisted the Dean in the various extra curricular activities.

The Trimester system of studies for Post-Graduate and Under-Graduate Programmes were introduced from the academic year 1977-78. During the period under report the first to third B.V.Sc. Students and Post Graduate students were studying the Trimester system.

1. **Admission** : The First and Third B.V.Sc. courses under Trimester pattern were commenced on 26 10.79 and Second year on 6.11.79. The classes for the Third B.V.Sc October, 78 batch, Fourth B.V.Sc. July, 79 batch, Fourth B.V.Sc. July, 79 batch, Fourth B.V Sc. October, 78 batch, Fifth and Final B.V.Sc. October, 78 and July, 79 batches under traditional pattern commenced on 18.7.79. The Post Graduate courses for M.V.Sc. and Ph.D. were commenced on 5.9.79.

The following are the details of the number of students on roll year wise: First B.V.Sc. 115; Second B.V.Sc. 109; Third B.V.Sc. 126; Fourth B.V.Sc. 115; Final B-V.Sc. 131; M V.Sc. 60 and Ph D. 65.

Under the Post Graduate degree programme, 19 staff members in M.V.Sc. degree and 61 staff members in Ph.D. degree programme were studying under Part-time basis.

The Ph.D. programmes have been newly introduced in the following Departments from the academic year 1979-80 with a strength of 3 students in each discipline : Obstetrics and Gynaecology and Pharmacology.

The percentage of passes in the Final B.V.Sc. and M.V.Sc. Examinations are given bellow :

Course	No. of students appeared	No. of students passed	Percentage pass
Final B.V.Sc. (I.R.) May, 1979	31	24	77%
Final B.V.Sc. (I.R.) September, 1979	72	49	68%
Final B.V.Sc. (I R.) December, 1979	23	16	70%
Final B.V.Sc. (I.R.) March, 1980	74	46	62%
Final M.V.Sc.	21	21	100%

2. **Training Programme** : The students of I and IV B.V.Sc. were sent to Livestock Research Station, Hosur (Dharmapuri District), and III B.V.Sc. were sent to District Livestock Farm, Orathanad, for practical farm training from 19.9.79, 2.6.79 and 2.6.79, respectively. The students of II B.V.Sc. underwent Inplant Training for 35 days from 5.9.79.

3. **Educational Tour** : The students of V and Final B.V.Sc. July, 78 and October, 78 batches were sent to on an All India Study Tour for a period of 30 days from 10.6.79 and 2.6.79, respectively.

4. **Scholarships** : The details of scholarship availen by the stunents are as follows :

Name of scholarship		Under Graduate
Backward Class Scholarship	...	175
Harijan Welfare Scholarship	...	107
Harijan Welfare Loan Scholarship	...	58
Backward Class Loan Scholarship	...	6
National Loan Scholarship	...	18
National Scholarship	...	3
Ex-Servicemen Scholarship	...	3
College Scholarship	...	...
I.C.A.R. Scholarship	...	34
Government of India Cultural Scholarship	...	4
Nagaland State Stipend	...	1
Andaman and Nicobar Administration Scholarship	...	2
Meghalaya State Scholarship	...	5
Adhoc Merit Grant	...	3
Total	...	419

During the academic year 4 Ph.D. students were receiving Senior Fellowship at the rate of Rs. 400/- p.m. awarded by the ICAR on merit basis. Tnree M.V.Sc. students were in receipt of Junior Fellowship of Rs. 300/- p.m. awarded by the ICAR on merit basis.

FACULTY OF FISHERY SCIENCE

The Fisheries College, Tuticorin offered a four year degree programme to B.F.Sc , under trimester systems of teaching 20 students were admitted and the first batch of students are now in the III year. Various courses on fisheries were offered to II and III year B.F.Sc., students of this college.

A seminar on 'Teaching Fisheries' was organized and the Curriculum for B.F.Sc., degree course was discussed. A revised syllabus for B.F.Sc., programme was finalised.

1. **Educational Tours :** The III B.F.Sc. students of this college were on Educational tour to Fisheries Institutes in Tamil Nadu for 10 days form 30.1.80 to 10.2.80.

2. **Scholarships :** The details of the scholarships awarded during 1979-80 are furnished below.

Name of the Scholarship	No. of Under-gruaduate Students
Backward Class Scholarship	13
Harijan Welfare Scholarship	5
S.C. Loan Scholarship	4
National Merit Scholarship	2
National Loan Scholarship	2
ICAR Merit Scholarship	2
	28

3. **Students' Hostels:** There were two hostels in rented buildings of the II and III B.F.Sc students. Dr. K. Venkataramanujam, Assistant Professor was serving as the Deputy Warden.

4. **Student's Club :** Thiruvalargal S. Ravishankar III B.F.Sc., P. Ramasamy II B.F.Sc. and Rangarajan III BF.Sc. were nominated as Club Secretary, Joint Club Secretary and Games Secretary respectively for the year 1979-80.

The inaugural function of the Students' Club was held on 13th December 1979 and Thiru Samir Vyas, I.A.S., Assistant Collector, Tuticorin delivered the inaugural address.

(iv) A five day residential training was imparted to 40 youths of Nehru Yuvak Kendra on the latest technologies in rice, pulses, oilseeds, vegetables, fruit cultivation, inland fisheries and farm machinary.

(v A three months residential training was conducted for the benefit of 23 farm youths on latest technologies in crop production.

(vi) A six months residential training programme sponsored by Small Farmers Development Agency for the benefit of 26 youths was conducted under TRYSEM. Training was imparted on integrated pest control, tractor mechanism, fruits and vegetables cultivation and gardening.

4. **Farmers Day** : In collaboration with the Department of Agriculture, the Farmers' day was celebrated at Krishi Vigyan Kendra, Pondicherry on 21.2.80. The Vice-Chancellor presided over the function, when Hon'ble Chief Minister, Minister forAgriculture and Minister for Education gave special addresses. A new rice variety viz. P 1275 derived from progeny of cross between Kannagi and Cult. 2032 with short duration and fine grain was released during the function. It was named as 'Punithavathi'. More than 200 farmers from different villages in Pondicherry and Karaikal regions attended the programme and participated in the seminars.

5. **Lab to Land Programme** : The Lab to Land Programme was initiated in two villages of Pondicherry reglon viz., Thondamanatham and Ramanathapuram, involving 300 families with a land area of 316 acres, where farming and allied agricultural systems are being practiced with improved technologies.

Depending upon the physical, chemical and topographical nature of the soil and availability of water, the existing cropping pattern covering paddy, groundnut, cotton, cumbu and vegetables has been studied. The yield potential was assessed. It was observed that the yield per unit area/unit time could further be increased by introducing new technologies which resulted in additional income.

For the current season, in paddy, technologies such as (1) raising of super seedlings, (2) asplication of plant nutrients through organic and inorganic manures based on S.T.L. recommendations and (3) application of need-based plant protection measures have been introduced at first level.

b) **Kumaraperumal Farm Science Centre, Tiruchirapalli :** The chief objectives of this centre is to impart need based, skill-oriented vocational training to practising farmers, young school drop-outs with farm back-ground and farm women and rural youths.

1. **Training Programmes** : During the year 35 training programmes (including 4 for women) have been conducted and 3194 candidates were trained. In each programme 15 to 20 farmers were trained. The subjects dealt with were (i) Agriculture, (ii) Horticulture and (iii) Animal Husbandry. All

the programmes were of one day to 30 days duration. The details of the courses conducted are as follows :

	Subjects dealt with	No. of participants	Duration in days
1.	Improved methods of paddy cultivation	203 Trainees	1, 2 and 3 days
2.	Improved methods of millets cultivation (Cholam, Cumbu, Ragi and Minor millets)	118 ,,	1, 2 and 3 days
3.	Maximisation of production in Groundnut	156 ,,	1, 2 and 3 days
4.	Cotton cultivation	88 ,,	1, 2 and 3 days
5.	Sugarcane cultivation	57 ,,	1, 2 and 3 days
6.	Banana cultivation	105 ,,	1, 2 and 3 days
7.	Chillies cultivation	361 ,,	1, 2 and 3 days
8.	Horticulture including vegetables and economic flowers cultivation	178 ,,	1, 2 and 3 days
9.	Kitchen gardening	38 women	1 and 2 days
10.	Ornamental gardening	42 ,,	1 and 2 days
11.	Reclamation of Alkaline and saline soils	42 Trainees	1 and 2 days
12.	Dry farming techniques	46 ,,	1 and 2 days
13.	Citrus (Acid lime) cultivation	45 ,,	1 and 2 days
14.	Fruit crops	44 ,,	1 and 2 days
15.	Tuber crops cultivation	29 ,,	1 and 2 days
16.	Selection, feeding and maintenance of Dairy cows and milk production	338 ,,	1, 2 and 3 days
17.	Selection, feeds and feeding of poultry including poultry ailments and control	59 ,,	1 and 2 days
18.	Maintenance of Goats and sheep	29 ,,	1 and 2 days
19.	Cococut cultivation	28 ,,	1 and 2 days
20.	Cashewnut cultivation	42 ,,	1 and 2 days
21.	Oil seed crop	45 ,,	1 and 2 days
22.	Crop production and Management	26 ,,	1 and 2 days
23.	Fodder cultivation	27 ,,	1 and 2 days
24.	Dry Paddy cultivation	29 ,,	1 and 2 days
25.	Rat control	32 ,,	1 and 2 days
26.	Plant protection	168 ,,	1 and 2 days
27.	Seed production and storage	27 ,,	1 and 2 days
28.	Weed control	28 ,,	1 and 2 days
29.	Horticulture and Animal Husbandry (from 2.11.79 to 30.11.79)	15 ,,	30 days
30.	Horticulture and Animal Husbandry (from 18.1.80 to 16.2.80)	15 ,,	-do-
31.	Horticulture and Animal Husbandry (from 10.3.80 to 14.4.80)	14 ,,	-do-
32.	Chillies, Cashewnut, Mango, Vegetables and Animal Husbandry, Thathanur Keelveli	260 ,,	1 day
33.	Chillies, Cashewnut, Mango and Vegetables and Animal Husbandry, Anganayanathur	140 ,,	1 day
34.	Cattle, Poultry, and Vegetable, Ammapettai	150 ,,	1 day
35.	Poultry, Paddy and Horticulture, Muthukulam	210 ,,	1 day

2. **Farm Science Club :** One hundred and thirty nine Farm Science Clubs enrolling 2,731 active participants have been formed. The members of these clubs assist in quicker ane effective dissemination of modern farming technology.

3. **Details of Farm Advisory Council work**: The Principal and members of the K. V. K. staff, Tiruchirapalli visited 68 villages of Tiruchi district and suggested practical advice in solving the following problems :

1. Control of Rice stem borer, Blast and Helminthosporium disease in Rice
2. Use of Blue Green Algae in rice production
3. Virus diseases - Tungru Vector - Green Jassids in paddy and its control
4. Soaking of cholam seeds in Micro-nutrient mixture
5. Zinc sulphate application to Cumbu
6. Root Dipping in Ferrous sulphate for Ragi
7. Biofertilizers - Azotobacter in Ragi
8. Application of Lime in Black gram fields
9. Pelleting of seed in Black gram with super phosphate and manganese sulphate
10. Use of Micronutrient (copper sulphate at 5 kg/acre) in Green gram
11. Use of Rhizobium in groundnut cultivation
12. Shoot Webber and Phyllody in Gingelly
13. Plant hormone spray in Sunflower
14. Virus Diseases in Tomato, brinjal and chillies
15. Yellow vein Mosaic Disease in Bhendi
16. Wilt in Turmeric
17. Virus Diseases in Tapioca
18. Sweet potato weevil control
19. Performance of Multiple budded Mutant in Sugarcane
20. Weeds and weedicides in Sugarcane
21. Chemical Ripeners in Sugarcane
22. Pests and Diseases control in chillies
23. Pruning of Mango
24. Hoppers and Mildew control in Mango
25. Button shedding in coconut
26. Fodder legumes and grasses for feeding milch cattle
27. Poultry keeping and Piggery
28. Goat and sheep Rearing
29. Ducks and Turks Rearing
30. Citrus Die Back (Quick Decline)
31. Citrus canker
32. Manuring of Banana varieties
33. Gobar gas plant
34. Maize - Cowpea as a feed to cattle

4. **Farmers Day** : The Farmers Day was celebrated at Kumaraperumal Farm Science Centre, Tiruchi on 15.12.79. The Director of Extension Education presided over the function. Dr J.T. Rao, Zonal Coordinator of the ICAR in-charge of Lab to Land Programme in Tamil Nadu, Kerala and Karnataka states delivered a special lecture. A seminar on the training and research needs of farmers was organised. Specialists from University main campus - Coimbatore and Madurai Campus and other centres of the University and officers of the Departments of Agriculture and Animal Husbandry also participated. Farmers of the Tiruchi district have brought crop specimens which were raised as per the recommendations advocated during the course of training programmes. Dr. M Ramachandran, Chief Technical Officer and Adviser to State Bank of India, Madras addressed the members of Milk Society, distributed loan towards the purchase of milch cattle. Thiru A. Krishnan, Chief Regional Manager, State Bank of India, Madurai also attended. The Training Programme for Youth Leaders of Nehru Yuvak Kendra members was inaugurated. Dr. K. A. P. Viswanathan, Tiruchi delivered a special talk on Farmers Day and donated a Radio (Rs. 1,000) and instituted various prizes (Rs. 1200) for the leading farmer trainees who had undergone training in various subjects taught. Dr. P. V. Marappan, Director of Extension Education, TNAU, presided for the function of Farmers Day.

5. **Lab to Land Programme** : Dr. J. T. Rao, Zonal Co-ordinator for Southern states explained in detail the objectives of Lab to Land Programme and the usefulness of the programme to the farming community. The staff of KFSC have adopted 300 families in Ariyavur, Kallikudi and Navalur Kuttapattu villages in Manikandam block of Tiruchi district. These farmers were assisted in adoption of improved cultivation practices and better animal husbandry practices by supplying various inputs to the tune of Rs. 500/- per family per year.

4. RESEARCH

The research activities of the scientists at Coimbatore, Madurai, Madras and Tuticorin campuses and at the various research stations and centres and Krishi Vigyan Kendras located at Trichy and Pondicherry during 1979-80 are reported hereunder. The major thrust of research was to solve field problems with a multi-disciplinary approach. Basic research in different disciplines was carried out simultaneously to derive long term benefits and in these efforts post-graduate students were also involved.

The salient findings of research work carried out in the University during the year 1979-80 were reviewed at the joint meetings of Research and Extension Education Councils. Newer problems were also identified, discussed and new projects formulated.

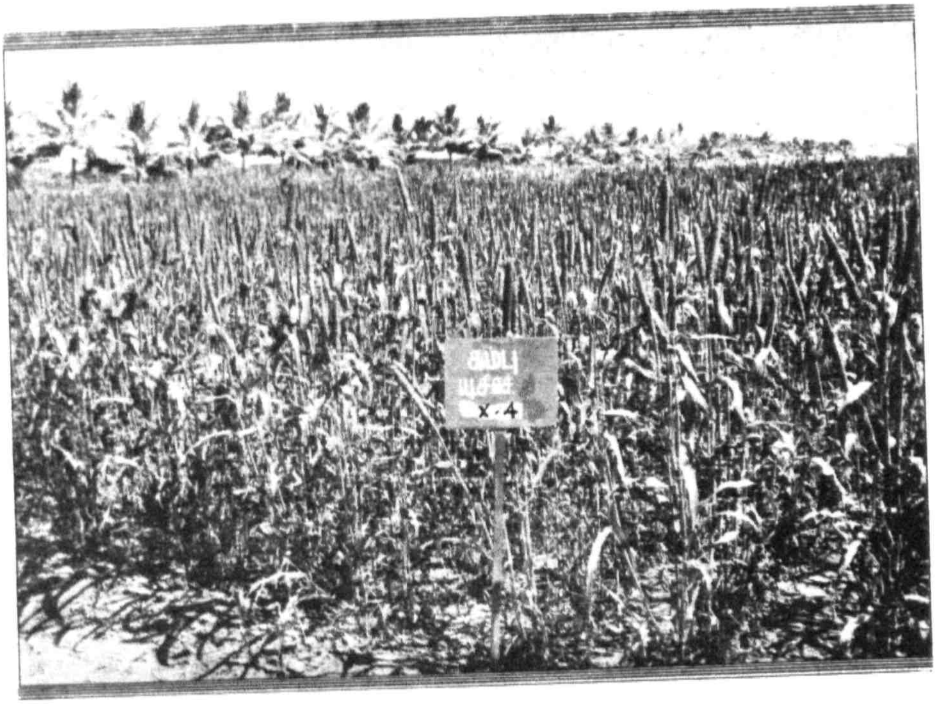
There were 1488 research projects in the various branches of Agricultural Sciences under the University including all the Coordinated Research Projects and ad-hoc schemes financed by I.C.A.R., I.C.S.S.R., U.G.C., D.S.T., D.E.S., I.A.E.A. and other public and private foundations and agencies. The Dean of each College was responsible for the supervision of research activities carried out by the staff and post-graduate students of the respective colleges. The Director of Research (Agri) besides coordinating all the research activities of the University was directly responsible for the research work carried out in the Research Stations of the University. The Director of Research (Animal Sciences) coordinated the research work in the field of Veterinary and Animal Sciences. The progress of work under the research projects was reviewed by the Vice-Chancellor as well as by the Directors of Research and the respective Deans of Colleges, and based on the review, modifications were made wherever necessary to bring out the objectives to solve the field problems of the farmers. The progress of work was also reviewed by the Research Council and Extension Education Councils of the University.

Both the Councils offered recommendations on the research policy and programmes of the University which were highly useful in formulating new projects as well as modifying the existing ones. In addition, Research Direction and Review Committees consisting of the University Scientists and leading farmers constituted during the previous year for various crops to review the work done in the University continued to function this year also. The findings

Dr. M. S. Swaminathan, Member, Planning Commission
looking at the new lowcost Biogas Plant

MDU 1 High yielding drought resistant rainfed rice

Sorghum Co 24, a dual purpose variety

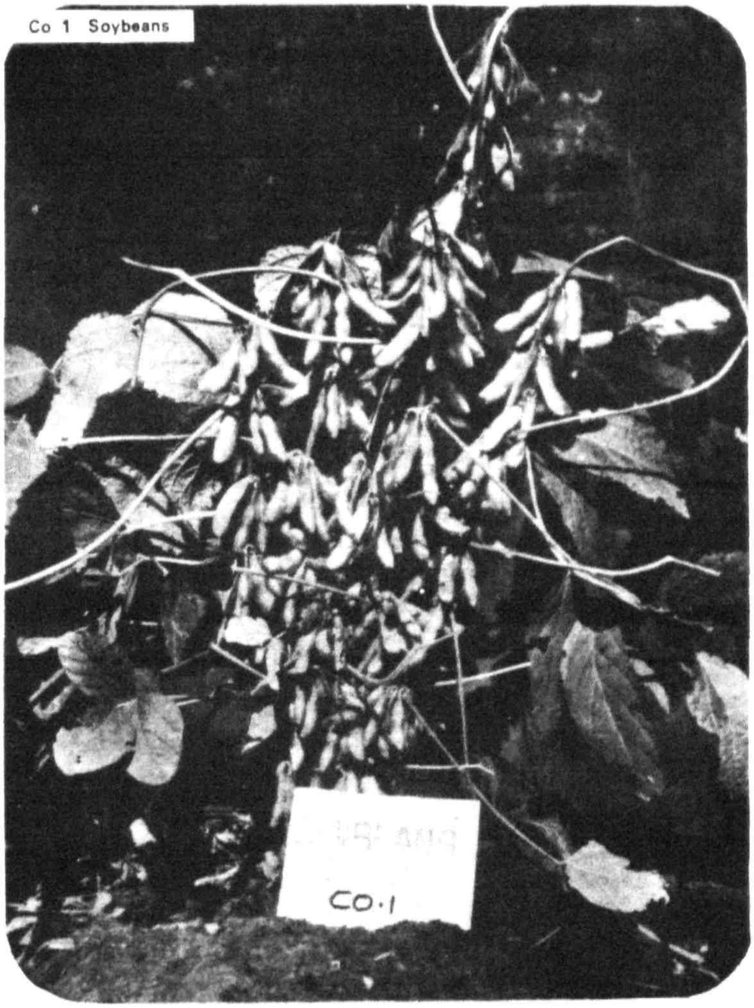


X 4 Hybrid cumbu, tolerant to Downy Mildew

High yielding Varagu Co 3 for Rainfed Farming

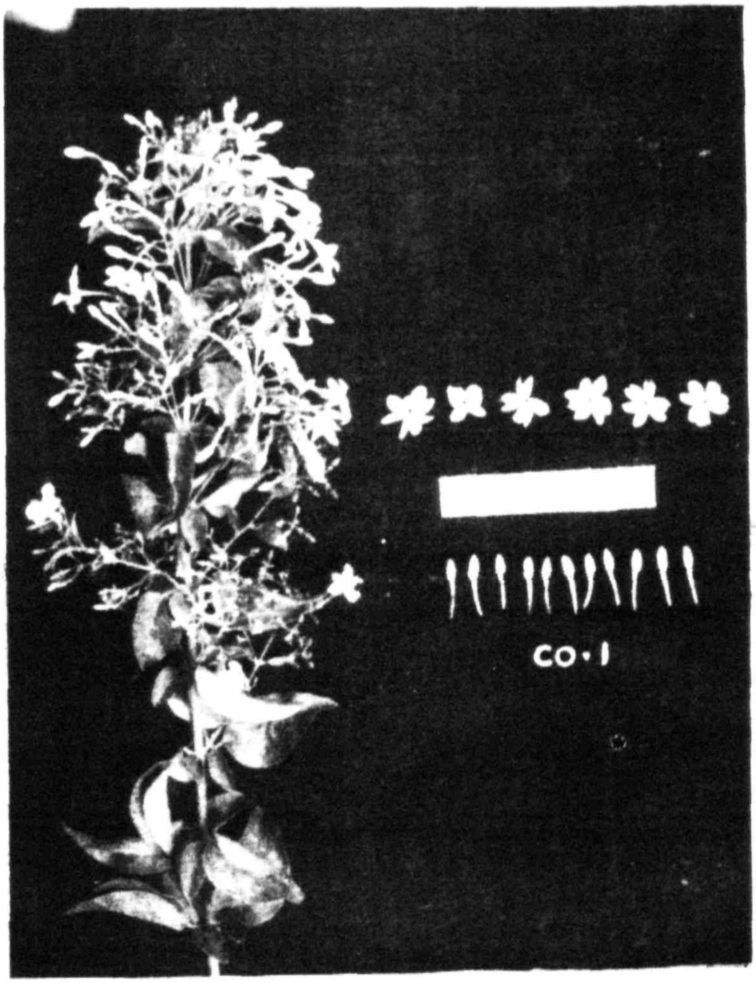
Soybean Co 1

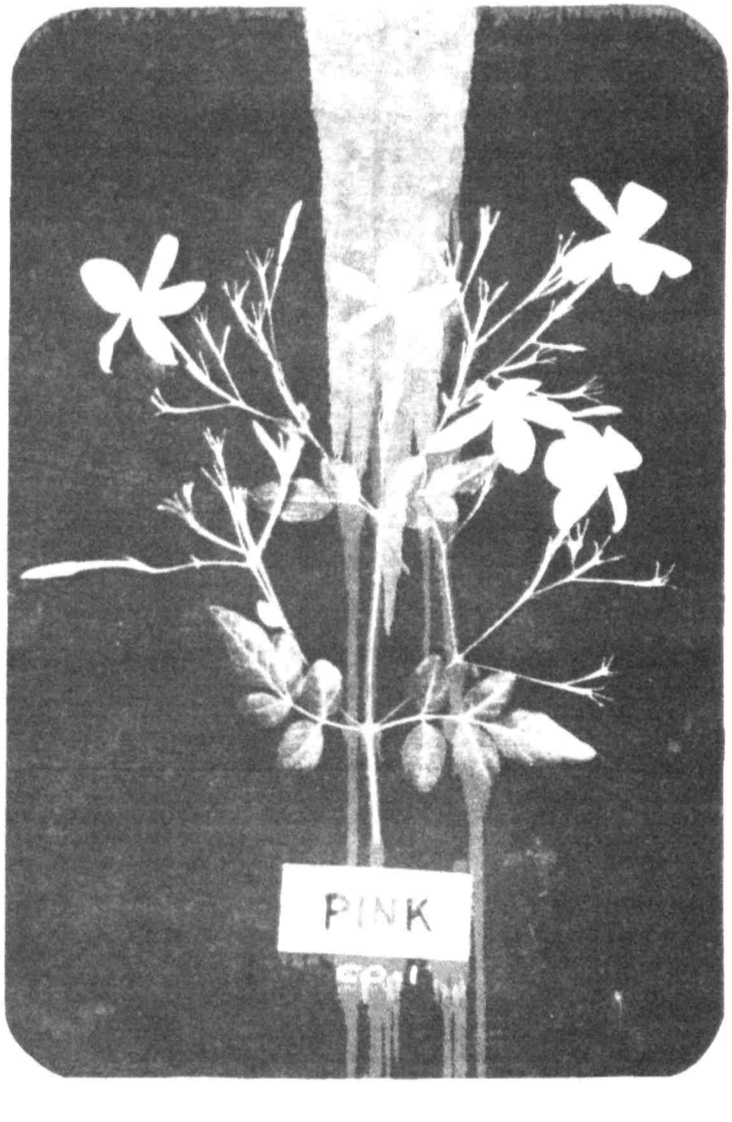
Co 1 Soybeans



Co 1 Mochai for Dryland

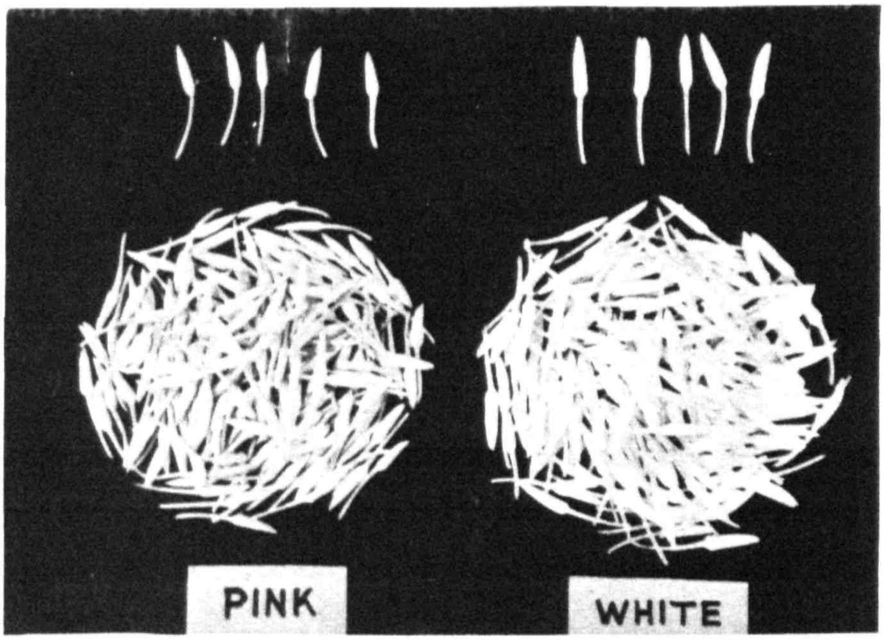
Mullai Co 1




PINK

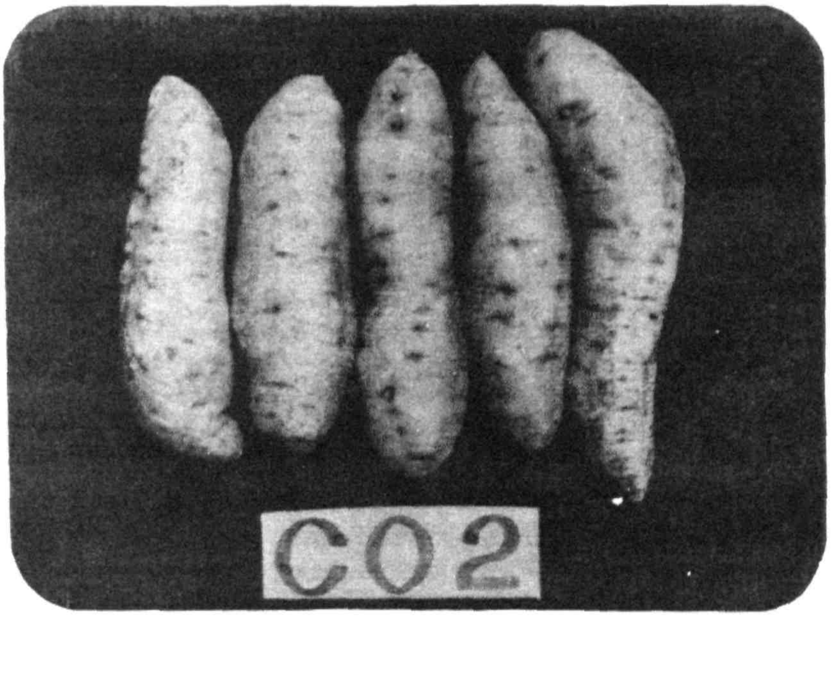
Co 1 Pitchi

Co 1 Pitchi

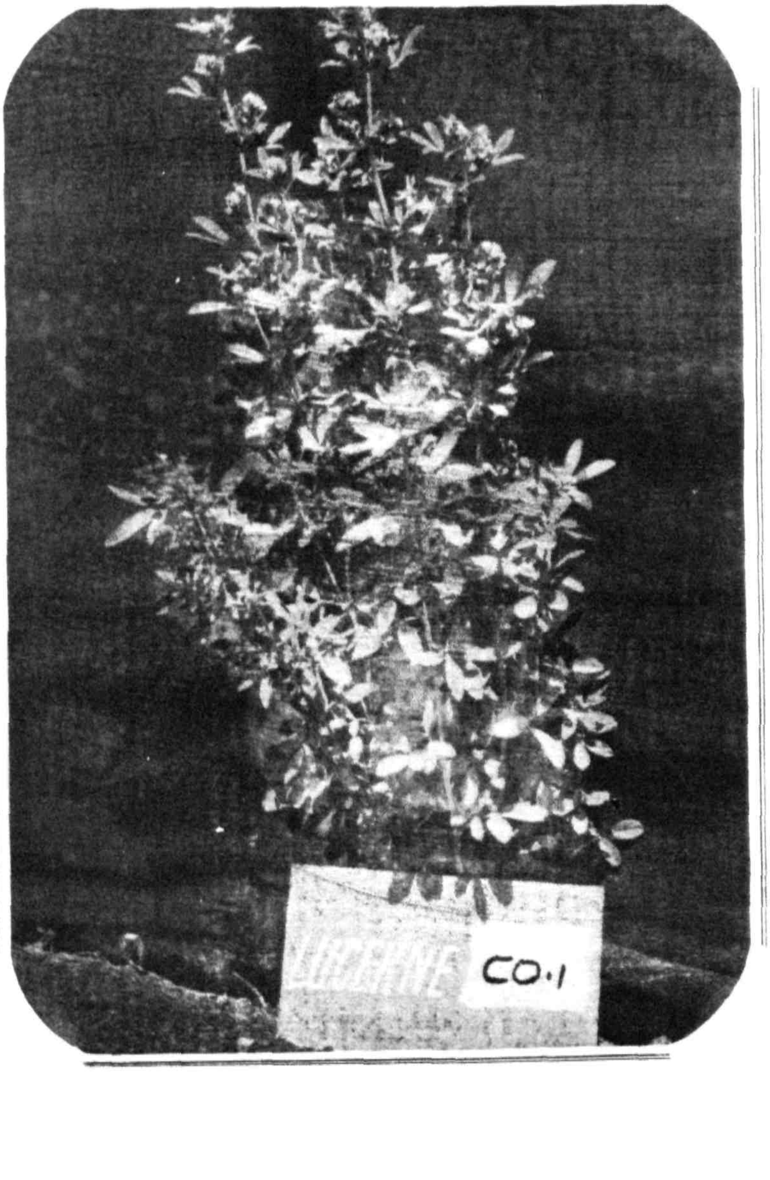


Co 2 Sweet Potato

Sweet Potato Co 2



Lucerne Co 1



of the various projects were furnished to the Communication Centre for processing and quick dissemination to the farming public. A summary of the research findings in the research programmes of the University are given below department-wise and within the departments cropwise wherever possible.

FACULTY OF AGRICULTURE

SCHOOL OF GENETICS

The Department of Agricultural Botany was engaged in the development of new varieties of major crops of Tamil Nadu. It dealt with rice, sorghum, cumbu, maize, minor millets, pulses, oilseeds, cotton, jute and mesta. Under each crop, attempts were being made to evolve varieties to suit various agro-climatic regions of Tamil Nadu. Besides, resistance to major pests and diseases was incorporated in the varieties evolved.

The Department was also engaged in the production of Breeders' seed for all the important varieties released by Tamil Nadu Agricultural University. It also associated with the extension directorate in programme of training and propagation of improved technology of crop production.

With a view to strenghthen the research base for crop improvement through breeding with help of genetics and cytogenetics, the Department of Agricultural Botany was upgraded to School of Genetics headed by a Director from 1.3.1980.

The most important highlights of achievements in crop improvement in respect of major crops of Tamil Nadu are presented below :

1. Cereals

(i) **Rice :** At Coimbatore, in the duration group of 100 - 120 days, the culture IET. 3280 (Dungansali x IR. 8), a medium tall variety with medium grain quality recorded an average yield of 5 t/ha representing 44 per cent increase over Co. 41, a fine grained variety and 26 per cent over ADT. 31. It matured in 115 days and was suitable for *Kar*, *Navarai* and *Sornavari* seasons The culture TNAU. 14562 (IET. 6149) (Dawn x Co. 33) gave an yield of 5 t/ha registering an increase of 22 per cent over that of Cauvery in a duration of 120 days.

The culture, TNAU. 1756 (TN. 1 x Bhavani) which possessed the same yield potential and grain quality as Bhavani was shorter in stature and earlier by two weeks than Bhavani. It was tolerant to blast, sheath rot, stem borer and leaf roller.

Three cultures namely TNAU. 18620, TNAU. 18580 and TNAU. 18520 gave consistantly more than 5 t/ha, the yield increase being 31,8 and 7 per cent higher than ADT. 31 respectively. These cultures mature in 115 - 120 days.

Another culture TNAU. 7892 (IET. 3629) (Manila x IR. 22) maturing in 120 days as Vaigai recorded 27 per cent increased yield with fine quality grain. Besides culture TNAU. 13613 (IET. 3626), a mutant from TKM 6 recording an yield of 5 t/ha in 120 days, was found to have resistance to Tungro virus.

TNAU. 15776 (ASD. 5 x IR. 20) was a medium tall variety with fine grain quality as ASD. 5. It was suitable for samba and late samba seasons and for late planting with tolerance to leaf blight and blast. It has an yield potential of 5.5 t/ha with a duration of 140 days.

IET. 5656 (150 days) was suitable for *Samba* and *Thaladi* seasons with tolerance to blast and sheath rot; has an yield potential of 6 t/ha with 26 per cent and 10 per cent more than Co. 38 and Co. 40 respectively. Another culture TNAU. 15875/1 has consistantly recorded 6 4 t/ha registering 36 per cent increase over Co. 38 and 20 per cent over Co. 40.

TNAU. 17005 (Dasal x IR 20) (135 days) with an yield potential of 5 tons/ha was suitable for cultivation in alkaline saline lands.

The culture IET. 6262 (Pankaj x Vijaya) (135 days) with an yield of 6.5 t/ha was found to have high resistance to rice tungro virus.

Cultures IET. 3280, TNAU. 17005 and IET. 5656 were advanced to adaptive trials.

At Aduthurai, in the duration group of below 100 days, four varieties namely, IET. 3280 (Dungansali x IR.8), IET.6155 (IR.20 x IR 24), Culture 13932/2 (Cult. 340 x IR 20), IET.3626 (Mutant of TKM.6) and IET.3629 (Manila x IR.22); in the duration group of 100-120 days, three cultures of IR. 20 x Kannagi and two cultures of Kanchi x IR.28; in the 120-140 days duration group, TNAU. 15776/3 IR 20 x ASD.5) and In the long duration of 140-160 days IET.5899 (Pankaj x Jagannath), TNAU.4336, TNAU.15868/1 and IET 5741 were found to be superior to the respective standards.

TNAU.(AD) 103, a derivative of Tiruveni x Co. 39 was found to be suitable for problem areas with irrigation water causing H_2S root injury.

At Madurai, culture 2 (IR 8 x Chitraikar) was released as a new strain MDU. 1 for large scale cultivation under rainfed conditions (July-August sowings). It gave an increased yield of 20% over that of *Chitraikar*.

At Paiyur, DPI. 863 (Cul. 2410 x CR. 12-178) in 100-120 days group and DPI. 591 (IR. 1721 x IR. 1416) x IR. 1330 in 120 - 140 days group were found to be promising. DPI. 591 gave consistantly higher yield than Bhavani, Ponni and GEB. 24 recording a mean yield of 7.8 t/ha registering 12 percent, 14 percent. and 98 percent increased yields respectively over the controls. Another culture DPI. 863 recorded significantly higher yields of 6172 kg/ha compared to that of Vaigai which registered 5714 kg/ha.

At Bhavanisagar TNAU (AD) 103, (Tiruveni x Co 39) with a duration of less than 100 days and IR. 34 in a duration group of 100-120 days were promising.

At Pondicherry a rice variety PY.2 (Kannagi x 2032) was released. It was found suitable for growing in *Navarai*, *Sornavari*, and *Kuruvai* seasons. Its duration is 95-100 days with yield potential of 4,5 to 5.0 t/ha. It was observed to be tolerant to brown plant hopper. Cultures P. 1276 (Kannagi x IR.29), P. 837 (IR. 28 x H. 4) and P. 857 (IR 8 x Co. 30) were found to be promising and hence been proposed for adaptive trials.

(ii) **Sorghum:** A new sorghum culture USV. 5, a pedigree selection from a cross CK.60A x SPR. 1341 was released as strain Co.24. It is suited for cultivation both under irrigated and rainfed conditions over varied agro-climatic regions. As an irrigated crop, Co.24 is capable of giving 5050 kg of grain per ha and under rainfed conditions it yields 2850 kg per ha. The fodder yield potential is found to be 16 and 12 tons/ha respectively for irrigated and rainfed crops. It also responds favourably to high doses of fertilizers, tolerates drought conditions.

Five promising cultures USV.4, USV.8, USV. 10 (Tall), USV. 12 and USV. 16 are being advanced to adaptive research trials.

At Kovilpatty, the dual purpore strain, sorghum COH.2 (Kovilpatty tall) recorded the grain and straw yields of 23 and 68 quintals per hectare respectively rendering a net profit of Rs. 1014/ha. The results of sorghum yield trials conducted since 1971-72 showed that hybrids COH.2, CSH.6 as well as varieties IS. 3541 and Co. 21 were found to be stable in their yield potential under varied conditions.

At Paiyur early duration (100-110 days) sorghum entries USV. 14, 16, 18, 72 and 10 recorded significantly higher yields ranging from 2125 kg to 2971 kg/ha as compared to the check Co. 23 recording 1474 kg/ha.

(iii) **Cumbu:** The hybrid UCH.4 (ms.5141A x PT.1921) was released as X-4 for general cultivation. Wide adaptability and resistance to downy mildew were the assets of this hybrids with yield potential ranging from 2500-3000 kg ha. Another hybrid UCH.9 (L. 111A x PT. 1921) was proposed for adaptive trials.

At Kovilpatti, cumbu KM.2 and UCH 4(X-4) registered grain yields of 14.6 and 14.5 quintals per hectare, rendering nett profits of Rs. 316 and Rs. 310/ha respectively. Yield trials conducted for the past three years revealed that hybrid UCH. 4 (X-4) and 1541 A x PT. 17 3 and variety Co. 6 recorded average grain yields of 18.1, 16.4 and 15.1 quintals per hectare respectively in the rainfed black soil area.

At Paiyur two cultures D. 34 and D. 254 recorded significantly higher yields of 1538 and 1192 kg/ha compared to that of Co. 6 (654 kg/ha).

(iv) **Ragi:** Hybrid derivatives TNAU.160 and TNAU.162 (ECW.1360/1-5 x Co. 10) and TNAU. 167 (ECW. 1260/1-5 x Co. 11) out-yielded Co. 11, the percentage of increase in yield being in the order of 83.5, 44.2 and 63.7 respectively. Of these, TNAU. 160 and TNAU. 167 have been included in adaptive trials.

At Pondicherry, selection TNAU. 51 recorded the highest yield of 3634 kg/ha representing percentage increase of 24.5 over the yield of Co.11 which registered 2918 kg/ha.

(v) **Tenai :** At Kovilpatti, Tenai was found better suited than Panivaragu for black soil area by rendering a nett profit of Rs. 484/ha compared to Rs. 100 per ha of that Panivaragu.

(vi) **Kudiraivali:** At Kovilpatti, Kudiraivali variety EF.7 recorded the highest grain yield of 14.7 quintals per hectare.

(vii) **Varagu :** The selection PS.175 recorded a mean yield of 2000 kg/ha and earlier than Co.2 by 20 days was released as Co.3.

At Paiyur also Varagu PS. 175 recorded an yield of 1358 kg/ha registering an increase of 28 per cent over the check, Co. 2 (1061 kg/ha).

(viii) **Panivaragu:** At Kovilpatti, MS.4926 recorded the grain yield of nine quintals per hectare, while Co.1 (Check) recorded 5.8 quintals per hectare,

(ix) **Maize:** Two hybrids namely UMI 29 x UMI. 51 and UMI-46 x UMI-130 maturing in 85 days yielded 6.3 and 6.9 tonnes of grain per hectare against 5.5 t/ha for Ganga 5, the percentage of increase being 15 and 26 respectively. These were also observed to be free from downy mildew.

(x) **Wheat:** Three bread wheat selections namely UW. 101, UW. 103 and UW.104 were distinctly superior to Kalyan Sona, UP.215 and HD.2189 recording 2.8 to 3.0 ton/ha in a duration of 85 days with an yield increase of 20 percent. These have been entered for adaptive trials.

2. **Pulses**

(i) **Redgram:** In the short duration group, an early maturing gamma irradiated mutant selection from Co. 1, namely, S. 14 gave a mean grain yield of 620 kg/ha in 110 days as against 405 kg/ha recorded by Co. 2 in 120 days; the increase in yield being 54 per cent over the standard. In the medium duration group, S. 80 recorded a mean grain yield of 1045 kg/ha as against 895 kg/ha recorded by Co. 3 with the same duration of 130 days registering an yield increase of 16 6 per cent. This promising selection is under multilocation trials.

At Pudukkottai, the varieties Pantnagar A.1 and Prabhat were found to be promising in earliness and productivity.

At Paiyur, three early duration redgram cultures, DPI. 711, DPI. 712 and DPI. 717 gave consistantly higher yields, ranging from 1342 to 2506 kg/ha compared to the check, Prabhat which recorded 865 kg/ha. Medium duration cultures, namely, DPI. 720, DPI. 779 and DPI. 791 gave high yields ranging from 8.1 to 10.0 Q/ha compared to that of Co. 3 (4.0 Q/ha).

(ii) **Blackgram:** The culture BP.3 with a duration of 75 days was found to be consistantly superior to Co.3, under rainfed conditions. BP.3 recorded a mean grain yield of 760 kg/ha as against 630 kg/ha by Co. 3, accounting for an yield increase of 20 per cent. This culture is under multilocation trials. A short duration culture C-5-61-1, a derivative of VZM.189 x P.133, maturing in 75 days had been identified for rice fallow condition. It gave 1000 kg/ha and had been advanced to adaptive trials.

At Pudukkottai, blackgram varieties Pant U.26 and Pant U.19 showed consistantly superior performance during two years of testing.

At Kovilpatti, Co 1 (105 days) and Co. 3 (80 days) were consistantly superior in their yield and hence they were recommended for general cultivation in the rainfed black soils of Southern Districts.

At Pondicherry, blackgram M.4 recorded the highest yield of 1115 kg/ha, while the standard Co.4 gave 871 kg/ha; the percentage of increase being 28.0.

At Paiyur, a local North Arcot variety of blackgram gave the highest yield of 1241 kg/ha, while Co.4 recorded 320 kg/ha.

(iii) **Greengram:** The Mutant 2, isolated from gamma irradiated Co.1 was found to be superior to Co.3. It has recorded a mean grain yield of 1420 kg/ha as against 1260 kg/ha recorded by Co.3. registering 13 percent increased yield over that of standard. Its performance was being assessed in adaptive trials.

At Pudukkottai, germplasm consisting of 378 types was maintained and being evaluated for economic traits.

At Kovilpatti, M. 2 (75 days) and Co 1 (105 days) were consistantly superior in yield and hence they were recommended for cultivation in Southern Districts.

At Paiyur, greengram culture DPI.703 recorded the highest grain yield of 1593 kg/ha, as against Co.2 and Co.3 (Checks), which registered 371 kg/ha and 556 kg/ha respectively.

(iv) **Field Lab Lab (Mochai):** The selection DL.2539 was released as Co.1 for general cultivation in the dryland tracts of Coimbatore, Dharmapuri and North

Arcot districts. It recorded a mean grain yield of 1997 kg/ha as against 892 kg/ha by local varieties accounting for two fold increase. It was found to be earlier than the local varieties by 40 days, possessing 33.5% protein, besides being tolerant to drought.

(v) **Soybean** : The promising culture UGM.20, a selection from Thailand variety was released as Co.1. It gave a mean yield of 1640 kg/ha under irrigated and 1090 kg/ha under rainfed condition. Its duration was found to be 85 days and resistant to stemfly and pod borer and moderately resistant to yellow mosaic. It can be grown in all seasons. Two promising cultures, namely, UGM. 21 and UGM.22, maturing in 65 days have entered the adaptive trials.

At Bhavanisagar, Co.1 (UGM.20) recorded the highest yield of 1969 kg/ha, when compared with ten other entries.

3. **Oilseeds**

(i) **Groundnut** : A total of 131 lines representing interspecific crosses of five genotypes of *A.hypogaea* with the wild species, *A.monticola* and *A. villosulicarpa* was established. The mutant 3 with a high yield potential of of 1980 kg/ha with an increase of 12.5 per cent over that of Co.1 and tolerance to leaf spot diseases had been developed from POL.1. It matures in 105 days. It is under adaptive trials.

At Aliyarnagar, in scattered block trial, Ah. 8457 recorded 36 per cent increase in yield over that of Co.1. A high yielding selection OSN.2 recorded a mean yield of 1395 kg and 1920 kg of pods per ha under rainfed and irrigated condtions representing 22.5 and 18.5 per cent increased yield, respectively over POL. 2.

(ii) **Sesamum** : A backcross derivative, TNAU. 2 (TMV. 3 x SI. 1878) x SI. 1878 and a mutant 3-1-2 recorded 29.9 percent and 20 percent increase in yield over that of TMV.3 (605 kg/ha). Under rainfed cropping, TNAU.2 gave a mean yield of 483 kg/ha against 397 kg/ha of TMV.3 registering an increase of 22 percent, besides possessing a desirable plant architecture. Another backcross derivative TNAU.3 TMV.3 x KRR.1) x TMV.3, yielded 514 kg/ha with an increase of 54 percent over that of TMV.4(335 kg/ha). The cultures have been advanced to adaptive trials.

(iii) **Sunflower:** A variety, SUF.2 of 80cm height with a duration of 65 days recorded a mean per day productivity of 18.6 kg/ha under irrigated condition against 14.5 kg/ha and 15.0 kg/ha respectively of the strains 68415 and 68414. Under rainfed culture, the newly developed variety yielded 19.1 kg/day/ha against 68415 and 68414 recording 14.2 and 11.0 kg/day/ha. Another variety, SUF. 3 with a duration of 90 days gave the highest mean yield of 2065 kg as against 1658 and 1760 kg/ha by 68415 and 68414, respectively.

At Bhavanisagar, under "Varietal renovation" a total quantity of 13.6 tonnes of elite seeds was produced and supplied to the State Department of Agriculture, for further seed increase and distribution.

(iv) **Castor:** At Madurai, an early maturing and high yielding mutant, AS.6 registered 33 per cent and 30 per cent higher yield than Aruna and SA.2 castor, respectively.

(v) **Coconut:** One thousand and one hundred hybrids (Dwarf x Tall) seedlings were produced and distributed.

At Veppankulam, in an evaluation of different coconut hybrids, East Coast Tall x *Ayiramkachi* gave the highest mean yield of 110 nuts/palm/year, the increase being 34 percent over that of the East Coast Tall (82 nuts). In the germplasm collection "Semi-Tall Green" gave the highest mean yield of 120 nuts per palm per year.

4. Fibre Crops

Cotton : A new culture, ELS. 527 yielded 1.5 q of seed cotton per ha with a lesser duration by 10 days when compared with MCU.9. Three inter-specific hybrids, namely, TNHB.122, TNHB.123, and TNHB.124 recorded 40-45 per cent increased yield with 20 days lesser duration compared to *Varalaxmi*. They are under adaptive trials. CBS.202 (*Barbadense* variety) gave 20 per cent higher lint yield than Suvin with 100 counts spinning. Two short duration cultures, RF.5-2 and RF.5-3 recorded 2-3 q higher lint yield with shorter duration by one week compared to MCU.7. For rainfed tract, a short duration variety, CRH.71 (160 days), possessing desirable yield and quality attributes as well as high resistance to blackgram was evolved and is under further test.

At Kovilpatti, C. 50 with better quality recorded 19 per cent higher kapas yield over Bharathi (check) in the rainfed tracts of Tirunelveli and Ramanathapuram districts. SRT. 1 and Bhagya along with other IC types, IC. 553, IC. 566, IC. 1526 and IC. 1600 were identified as sources of jassid resistance. Five types, BJA. 592, 101 - 102 B, Reba-B 50, HAR-L-231-24 and BARL. 142-9 showed resictance to blackarm disease.

At Srivilliputhur, the culture ELO. 668 D registered the highest mean yield of 1957 kg/ha of seed cotton as against 1620 kg/ha recorded by MCU 8, the increase in yield being 21 per cent, with the highest ginning percentage of 39.0 as against 36 6 per cent recorded by MCU. 8. Short duration rice fallow cultures of 135 days duration, SVPR. 124 and SVPR. 134 proved to be superior to MCU. 7 in fibre length and ginning percentage with the same yield potential. These are under adaptive trials.

5. Forage Crops

(i) **Grasses :** A green fodder variety, BN 2 (Bajra-Napier hybrid) recorded an yield of 318 as compared to 226 t/ha/year in NB. 21. Two lakh slips have

been distributed to the farmers. Another short duration annual fodder grass, "Dinnanath" highly palatable and relished by cattle, yielded 243 t/ha/year under irrigated condition. It can fit in easily in crop rotation.

At Kovilpatti, Napier-Bajra hybrid, NB. 21 recorded green fodder yield of 191.4 q/ha rendering a net profit of Rs. 621/ha compared to sorghum IS. 3541 (41.4 q/ha and Rs. 135/ha) and therefore was suitable as a rainfed fodder crop in black soil area.

(ii) **Legumes:** A new variety of lucerne, FS.85 recorded green fodder yield of 85-90 t/ha/year and excelled the All India variety, Sirsa-9 by 30 per cent. This variety was released as Co. 1.

(iii) **Leucaena:** A quick growing tree, Hawaiian Giant suitable for fodder in the marginal lands, when planted in a spacing of 1 m x 0.20 m yielded 42 t/ha/year in the first year of establishment in 3 cuts. The leaves of *Leucaena* was reported to contain crude protein uoto 30 per cent and can be fed upto 30 per-cent of daily ration to adult cattle.

6. Other Crops

Bhendi : At Madurai, four types, namely, 5/11, 5/1, 5/15 and 1/2, derived by back crossing between the F. 1 of wild type, Okra and MDU. 1 were found to be resistant to Vein-clearing disease coupled with high yielding potential and they are under scattered block trials.

AGRONOMY

The thrust in research in the Department of Agronomy was towards the following major areas :

1. Evolving appropriate technology with low levels of monitary inputs for major field crops.
2. Developing viable dryland technology.
3. Management of cropping systems in respect of soil fertility, weeds and water.
4. Developing cropping pattern and mid-course correction based on analysis of meteorological data.
5. Formulation of package of practices for newly released varieties of various field crops.

In addition short term projects were also under taken to find solutions to specific problems raised by farmers. The salient findings of research work done in this department are presented.

1. Agroclimatology

A. Weather at Tamil Nadu Agricultural University, Coimbatore

Collection of data on meteorological parameters is essential to understand crop-wether interactions and to relate yield and development of crops to climatic factors. The agricultural meteorology section of the department of Agronomy collected and interpreted the climatic data obtained from different research centres in Tamil Nadu. An analysis of weather parameters for the year 1979 is reported here.

(i) **Rainfall :** An interesting feature of the weather for the year 1979, was the unprecedented heavy rainfall (1300 mm). This was the heaviest recorded in the past 80 years. Past records revealed that Coimbatore received very high annual precipitation in the years 1924 (1085 mm) and 1972 (1049 mm) compared to the mean of 640 mm. The total rainfall of 1300 mm during the period under report was the all time record, received in 59 rainy days compared to the mean of 44 rainy days. Comparison of monthly total of rainfall received from January 1979 to December 1979 with long term average (25 years) is shown in Table 1.

TABLE 1. Monthly rainfall and rainy days (Coimbatore)

Month	Average rainfall		Rainfall in 1979	
	Amount (mm)	Rainy days	Amount (mm)	Days
January	8.4	0.7	—	—
February	3.6	0.5	121.9	4
March	15.1	0.8	17.7	1
April	48.5	3.4	43.6	4
May	67.7	4.7	25.1	2
June	40.5	3.6	93.8	8
July	65 2	6.2	40.1	5
August	30.1	3.4	23.9	3
September	45.8	3.6	101.3	7
October	142.9	8.9	163.7	9
November	110.5	6.2	663.9	15
December	59.4	3.3	4.8	1

Among the seasons, North-east monsoon season recorded the highest rainfall of 832.4 mm which was 147 percent higher than the normal. Winter season also recorded unusually high rainfall. South West monsoon season received above normal rainfall but hot weather period recorded below normal rainfall.

An unusually high rainfall of 121 mm was recorded in February compared to the mean of only 3.6mm for the month. June and September months received above normal rainfall. The rainfall during March, April, August and October was near normal. In the month of November alone the highest rainfall of 664 mm was recorded which was six times the normal (110 mm). The rainfall received during May, July and December was below normal.

The maximum amount of rainfall received during a single day was 107.5 mm in November. There were 5 occasions when rainfall was in excess of 75 mm per day and all these five days were in November.

(ii) **Temperature :** A maximum of 37.5°C was recorded on 7th April and the minimum of 14.6°C on 29th December. The daily maximum temperature ranged between 27 and 37°C and the minimum temperature between 17°C and 24°C. The difference between maximum and minimum temperature was 6 to 7°C during rainy periods and in the rest of the period it was 12 to 15°C.

(iii) **Sunshine :** On an average six hours of bright sunshine were recorded from middle of June to December. while nine hours were observed from January to May except on a few cloudy days. Invariably March-April months recorded the maximum of 10 hours sunshine per day.

(iv) **Relative humidity :** The relative humidity values were above 75 per cent in the morning throughout the year except in the last week of June when it was 70 per cent. However. from middle of June to middle of July and middle of October to middle of December the value exceeded 60 per cent in the afternoon. In the rest of the period the relative humidity ranged between 40 and 50 per cent except in March-April when it was below 40 per cent in the afternoon.

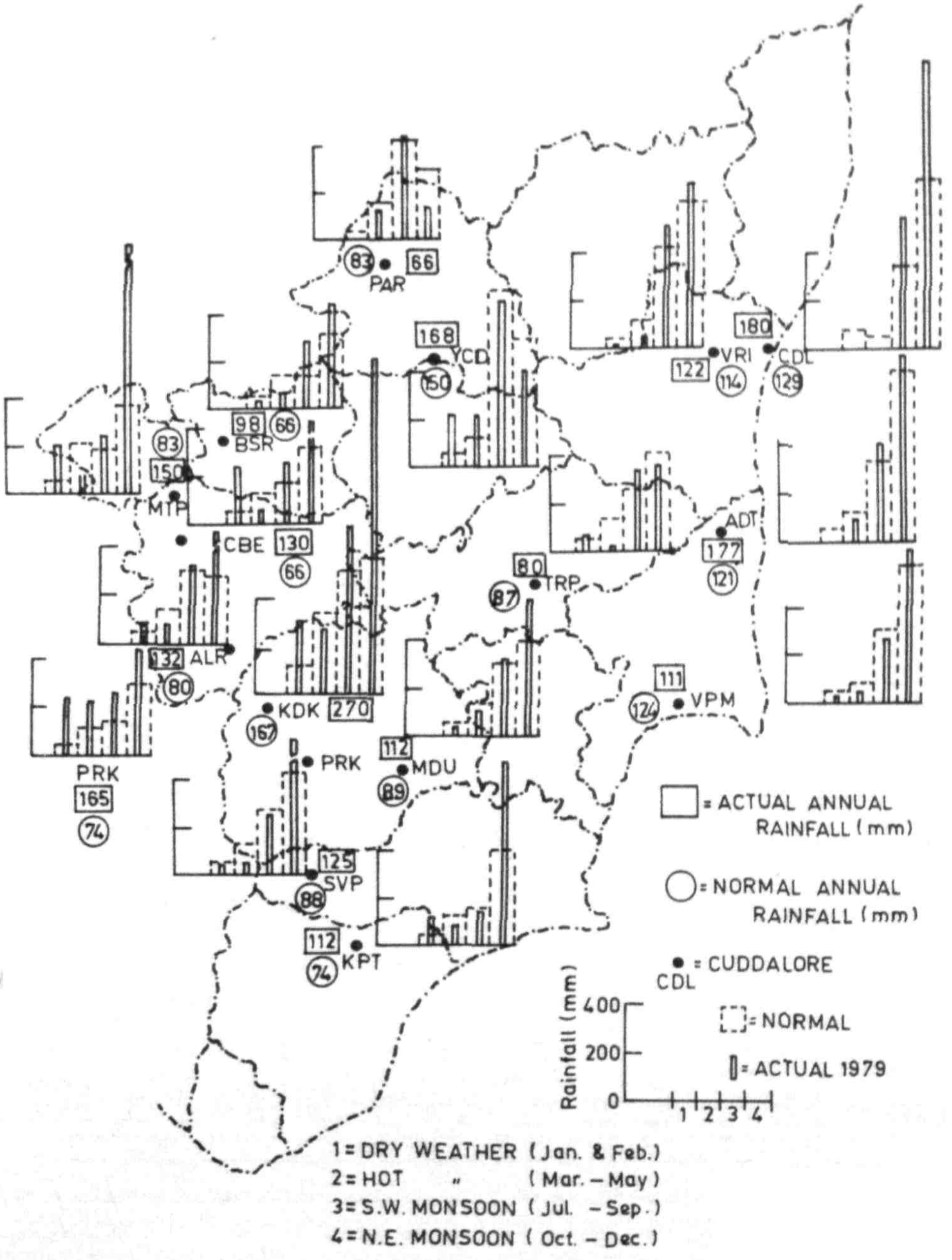
(v) **Evaporation :** Four to six mm evaporation was observed during the period, January to middle of March and October to December. In the rest of the period the evaporation ranged from 6 to 9 mm per day.

(vi) **Wind :** The period between June and August was quite windy when daily wind speed exceeded 10 kmph. A maximum daily average wind speed of 29.4 kmph was recorded on 1st July and 42 kmph on 31st July. In the rest of the period the daily average wind speed ranged between 4 and 6 kmph.

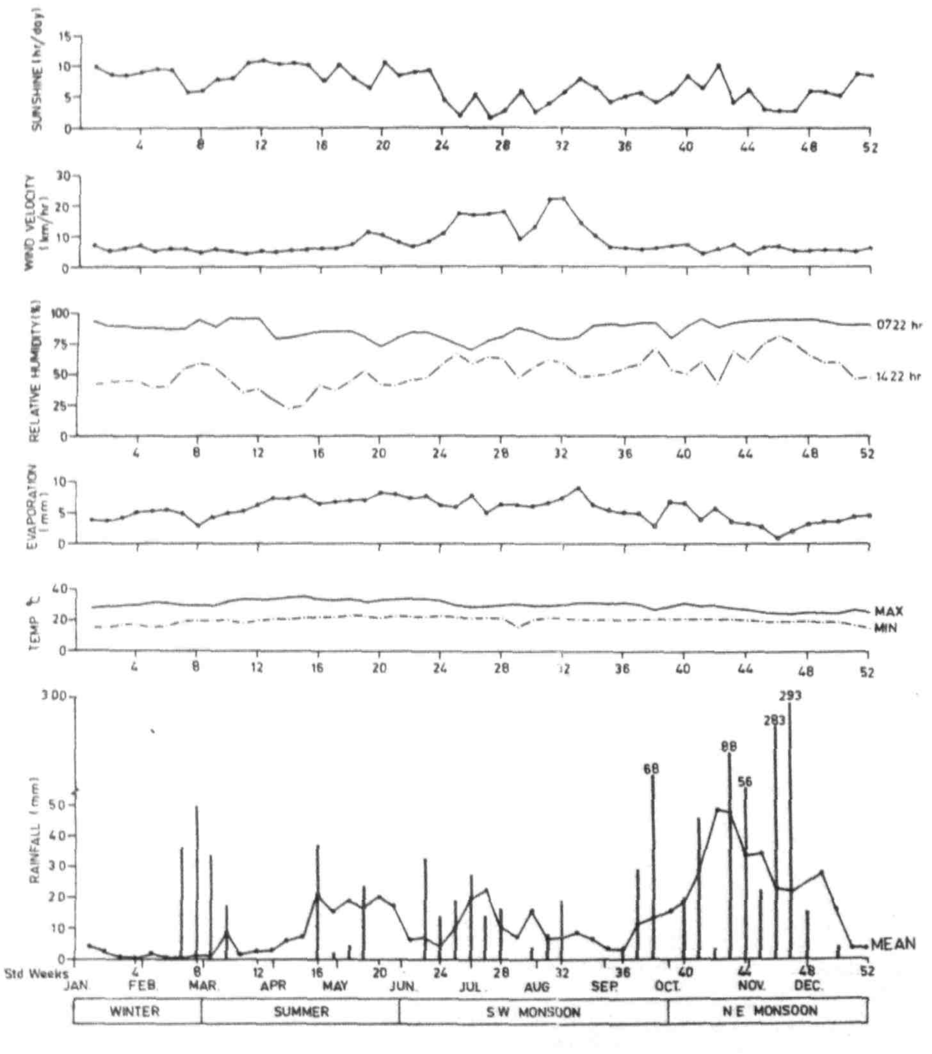
B. **Rainfall pattern in Tamil Nadu**

A welcome feature about the good rains of 1979 was that there was no cyclone damage in the State. This was significant in view of the historical fact that generally Tamil Nadu experienced heavy monsoon rains only as part of severe cyclones. Almost all the districts of Tamil Nadu have been favoured with more than double the normal amount of rainfall without heavy winds. Even

RAINFALL PATTERN IN TAMIL NADU – 1979



METEOROLOGICAL DATA FOR COIMBATORE CENTER 1979
(WEEKLY AVERAGE)



the traditionally deficit districts like Coimbatore, Tirunelveli and South Arcot have received copious rains during the North East monsoon. All the reservoirs were full and the rainfall pattern of this season was extremely beneficial for recharging the ground water sources.

Tamil Nadu has been fortunate even during the South West monsoon period. During June-September, the rainfall was either excess or normal in all the districts except Kanyakumari while many Northern States were faced with a failure of the monsoon.

On the other hand, during the period under report the rainfall in Tamil Nadu was in excess by 180 per cent in Tirunelveli (17 cm as against 6 cm); 100 per cent in Namakkal (62 cm - 31 cm) 90 per cent in Tiruchi (57 cm - 30 cm); 60 per cent in Coimbatore (25 cm - 15 cm) and 33 per cent in South Arcot (45 cm - 34 cm).

The North-East monsoon which set in over Tamil Nadu on October 22, was continuously active or vigorous throughtout the State during the second and third weeks of November. The available data showed that between October 1 and December 5, Coimbatore received 73 cm of rainfall against the normal of 24 cm, Palyamcottai 73 cm (Normal 39 cm); Kanyakumari 68 cm (30 cm) Madurai 69 cm (37 cm); Kodaikkanal 105 cm (55 cm); Dharmapuri 32 cm (27 cm) and Vellore 44 cm (39 cm). Only Thiruthuraipoondi received slightly below normal rainfall but even here the seasonal rainfall was 65 cm which was only 22 per cent less.

It was in the third week of November that Coimbatore received almost 23 times the normal rainfall (35 cm against 1.5 cm); Madurai 13 times its normal (19 cm against 1.4 cm) and Coonoor 8 times (60 cm against 7 cm).

2. Crops

A. Cereals

(i) **Rice :** At Coimbatore different sources and time of application of ureo were compared in transplanted rice, in two seasons i.e., during South-West and North-East monsoon season of 1979 (Table 2). In both the seasons granulated compost containing 5 per cent Nitrogen gave the maximum yield and response, followed by super granules of urea (2 cm size).

Field experiments were conducted during summer (February to June) and monsoon seasons (July to December) of 1978, with rice varieties IET 1444 and CO 40 respectively at Coimbatore with six forms of urea namely untreated urea, mud ball urea, paper packed urea, soil incubated urea, FYM enriched urea and neem seed crush treated urea and two levels of N (50 and 100 kg/ha in summer; 60 and 120 kg N/ha in monsoon). In addition single basal application, and split application with 75 per cent of the dose as basal dressing and the remaining 25 per cent as top dressing at panicle initiation were tried. The results

TABLE 2. Grain yield and response of rice to different sources and time of application of urea

Treatments, source, time and method of N application (kg/ha)			South-West Monsoon season		North-East monsoon season	
Basal	Tillering	Panicle initi-ation	Grain yield (kg/ha)	Response per kg of N (kg/ha)	Grain yield (kg/ha)	Response per kg of N (kg/ha)
0	0	0	3326	–	3069	–
60	0	0	3955	10.48	3454	6.42
30	0	30	3867	9.07	3878	13.48
30	30	0	4466	19.00	3903	13.90
0	30	30	4587	21.07	3553	8.07
60 NC	0	0	3983	10.95	4035	16.10
60 FYM	0	0	3869	9.05	3929	14.33
60 SG 1	0	0	5071	29 08	4262	19.88
60 SG 2	0	0	4959	27.22	4373	21.73
60 GC	0	0	5240	31.90	4711	27.37
		C.D. (P=0.05)	529		331	
		Variety	IET 5656		IET 1444	

NC – *Neem cake coated urea*
FYM – Pawn enriched farm yard manure
SG 1 – Super granules (1 gm size)
SG 2 – Super granules (2 cm size)
GC – Granulated compost

indicated that the grain and straw yield were increased in both the seasons by paper packed, mud boll and neem crush treated urea. Split application had no perceptible influence in summer but produced favourable response in the monsoon seasons (Table 3).

TABLE 3. Grain and straw yield under different forms of urea

Treatment	Grain yield (kg/ha)		Straw yield (kg/ha)	
	Summer	Monsoon	Summer	Monsoon
Untreated urea	3613	4528	4594	6100
Mud ball urea	4699	5742	5741	7001
Paper packed urea	4913	5760	5672	7058
Soil incubated urea	3705	4886	4374	6381
FYM enriched urea	3883	5120	4821	6476
Neem seed crush treated urea	4042	5408	5028	6945
C.D. (5%)	254	127	258	144

In the studies on influence of age of seedlings on grain yield with ADT 31 variety, conducted at Aduthurai, it was observed that there was reduction in

yield when 40 and 50 days old seedlings were transplanted in *Kuruvai* season. However, there was no significant difference in yield between 20 and 30 days old seedlings.

In another trial on harvest of rice at its physiological maturity stage, the optimum time of harvest of a short term rice like ADT 31 was found to be 30 days after 50 per cent flowering while it was 35 days for the medium duration variety IR 20 and 40 days for CO 38, a long duration variety.

Field experiment was conducted at Aduthurai for increasing the N use efficiency for low land rice. The result indicated that urea incubated with neem cake, farm yard manure enriched urea and granulated compost gave similar yield performance. Urea applied in split doses did not show any difference in yield.

Studies on the effect of neem cake blended urea on the yield of low land rice have indicated that basal application of urea alone or treated with neem cake or coal tar recorded similar yields.

The results of the trials conducted at Madurai are given below. In the trial on fixing suitable high yield paddy strains for double cropping in Periyar tract, six varieties viz., Vaigai, TKM. 6, Mutant, TNAU. 658, TNAU. 5202, TNAU. 14562 and IET. 1444 were tried for the first crop season. Among the varieties tested Vaigai recorded significantly higher yield of 4406 kg/ha than other varieties. Application of 120 : 60 : 60 kg of N, P_2O_5 and K_2O/ha recorded significantly superior yield of 4081 kg/ha when compared to 80 : 40 : 40 and 100 : 50 : 50 kg of N, P_2O_5 and K_2O/ha.

Among the ten varieties tested during the second season Mashuri and Bhavani recorded significantly superior grain yield of 3712 kg/ha and 3693 kg/ha respectively. Application of 120 : 60 : 60 kg N, P_2O_5 and K_2O/ha recorded the highest grain yield of 3031 kg/ha which was significantly superior to other levels.

In the trial on evolving agronomic practices for new rice cultures under upland condition, new rice cultures (Culture 1 and 2) yielded better than local varieties Chandikar and Chitraikkar. Application of N at 60 kg/ha in two split doses, half at tillering and half at panicle initiation was superior to three split application. Hand weeding twice was the most economical method of weed control when compared to Machete at 1.5 kg a.i./ha and Machete + hand weeding on the 30th day.

In the minimal tillage trial, two puddling with melur plough recorded the maximum grain yield. Among the varieties tested, IR.20 was significantly superior to the rest.

For rainfed paddy variety culture 2 (MDU. 1) 80 kg/ha of seed and 40 kg N/ha applied in two split doses at tillering and panicle initiation was found to be optimum.

Among the rice fallow crops tried, cotton recorded highest monetary return followed by groundnut and pulses.

A trial was laid out at Paiyur during kharif 1979 to demonstrate the suitable package of practices for economic rice production. By adopting the low cost technology practices such as use of biofertilizer, planting of 'Super seedlings', reducing the nitrogen and phosphorus levels of the STL recommendation and judicious water use, a saving of Rs. 482/ha on the cost of cultivation was achieved. A net profit of Rs.937/ha was also obtained by following these packages of practices as against Rs. 334/ha under farmers method of practices.

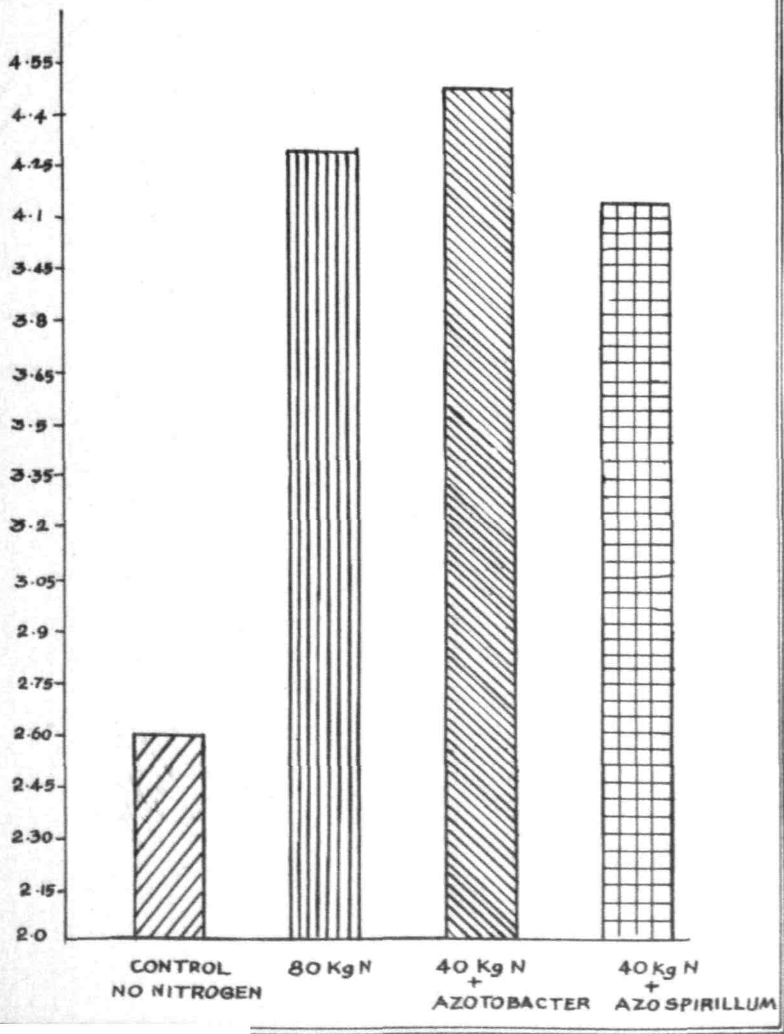
(ii) **Sorghum** : An experiment was conducted at Coimbatore during South-West monsoon of 1979 with CSH. 5 to evaluate biofertilisation with *Azotobacter* and *Azospirillum* in comparision to application of commercial fertilizers. The yield data indicated that there was a possibility of saving 50 per cent of recommended level of N (40 kg/ha) if biofertilization was adopted (Table 4).

TABLE 4. Effect of biofertilization on yield of sorghum

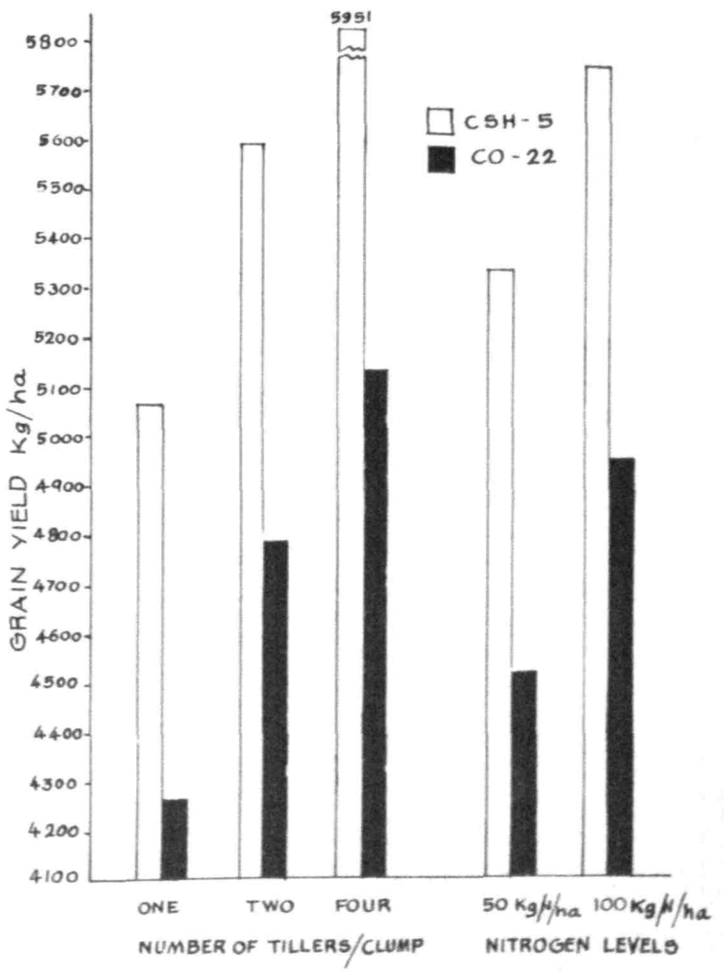
Treatments	Yield (kg/ha)
Control (No nitrogen)	2592
40 kg N/ha at sowing	3605
80 kg N/ha at top dressing 25-30 days after sowing	3414
80 kg N/ha half at sowing and half top dressing 25-30 days after sowing	4300
Farm yard manure at 10 tons/ha	2099
Azotobacter only	2805
Azotobacter + Farm yard manure at 10 tons/ha	3872
Azotobacter + 40 kg N/ha at sowing	4490
Azotobacter + 40 kg N/ha as top dressing 25 30 days after sowing	3576
Azospirillum only	3526
Azospirillum + Farm yard manure at 10 tons/ha	3526
Azospirillum + 40 kg N/ha at sowing	4166
Azospirillum + 40 kg N/ha as top dressing 25-30 days after sowing	4125
20 kg N/ha at sowing	2754
C. D. (5%) 1048	

An irrigated field experiment was conducted at Coimbatore in summer and south-west monsoon season of 1978, to elucidate information on the

EFFECT OF BIOFERTILIZATION ON YIELD OF SORGHUM



EFFECT OF NUMBER OF TILLER/CLUMP OF RATOON CROP ON GRAIN YIELD OF SORGHUM



suitable genotype for ratooning, number of tillers to be retained/clump in the ratoon crop and the residual effect of legume intercrop (cowpea) raised along with the sown crop of sorghum on the ratoon crop. In the sown crop, two genotypes of sorghum, CSH.5 and CO 22 and two intercrop treatments, with and without intercrops were imposed. Cowpea (C-152) was raised as intercrop in the ratoon crop with 1, 2 and 4 tillers/clump and two nitrogen levels (50 and 100 kg N/ha) were included. From the result it was inferred that both the genotypes ratooned well. CSH.5 gave higher total grain yield than 8022 but the later could be recommended specifically for multiple cropping system because of its lower duration. Leaving four tillers/clump resulted in higher grain yield. Increasing N application to 100 kg N/ha increased the grain yield. Intercropping with a legume in the sown crop did not leave any noticeable residual effect of the ratoon crop.

TABLE 5. Effect of number of tiller/clump of ratoon crop on grain yield of sorghum

Treatment	Grain yield (kg/ha)			
	Ratoon crop		Sown crop	
	CSH.5	CO.22	CSH.5	CO.22
Number of tillers/clump				
One tiller	5058	4261	—	—
Two tillers	5591	4778	—	—
Four tillers	5951	5132	—	—
C.D.(5%)	309			
Nitrogen levels				
50 kg N/ha	5325	4509	—	—
100 kg N/ha	5743	4938	—	—
C.D.(5%)	252			
Intercrop				
Without intercrop	5478	4674	5256	4608
With intercrop	5588	4774	5571	4959
C.D.5%	NS	NS	NS	

Among the various crop mixtures tried at Kovilpatty, under normal spaced sorghum (45 cm x 15 cm), sorghum + blackgram mixture gave the highest grain yield of sorghum (3822 kg/ha) and the maximum gross income (Rs. 3957/ha).

In the spacing trial with Kovilpatti Tall Sorghum the maximum yield of 1990 kg/ha and the highest fodder yield of 5704 kg/ha was recorded at 45 cm x 15 cm spacing.

An irrigation experiment was conducted at Madurai on Sorghum. Irrigation scheduled at 0.6 IW/CPE ratio during early vegetative phase (first 30

days) and at 0.9 IW/CPE ratio (no stress level - 30 days to maturity) recorded significantly superior grain and straw yields and was on par with no stress treatments throughout the crop period.

In order to find out the need or otherwise of basal application of fertiliser nitrogen for rainfed sorghum, an experiment was laid out in randomised block design during kharif 19 9. The results indicated that application of full recommended dose of nitrogen based on STL soil analysis either as basal or top dressing in combination with farm yard manure gave significantly higher yields than applying the fertilizer nitrogen or farm yard manure singly. When nitrogen alone was applied as top dress, it gave an increased yield of 202 kg/ha over application of nitrogen as basal (Table 6).

TABLE 6. Grain and straw yields sorghum as influenced by basal and top dressing of FYM and fertilizer nitrogen

Treatment	Yield (kg/ha) Grain	Straw
Farm yard manure, basal (Control)	730	11,319
Farm yard manure + N basal	1,079	12,348
Farm yard manure, basal + N top dress	873	11,662
N basal	373	10,702
N top dress	575	9,673
Half N basal + Half N top dress	528	10,702
Half N top dress on 25-30 + Half N top dress on 45-50 days of crop	439	10,359
Significance	S	NS
S. E.	140	1,591
C. D.	297	—

(iii) **Ragi** : Field experiment was conducted at Bhavanisagar during June-October 1979 with CO.11 ragi. The treatments consisted of 3 levels of irrigation at 0.6, 0.75 and 0.90 IW/CPE ratio and four levels of fertilizer 0, 30, 60 and 90 kg N/ha. The results showed that yields under irrigations were on par. Nitrogen levels showed significant differences. 90 kg N/ha gave the maximum yield of 3217 kg/ha. It can be concluded that CO.11 ragi grown during June-October can be irrigated with six irrigations with 90 kg N/ha. Interval between irrigations ranged from 10-12 days depending upon rain.

An experiment, to fix the economic dose of N, P and K for rainfed ragi was conducted during kharif 1979, with four levels of nitrogen, three levels each of phosphorus and potash in a split plot design with three replications. Application of nitrogen at 45, 90 and 135 kg/ha gave grain yields of 1076, 1784 and 2357 kg/ha with net incomes of Rs. 663, 1,227 and Rs 1,656/ha respectively over 0 kg nitrogen. Phosphorus and potash had no effect on ragi yields (Table 7).

TABLE 7. Economics of fertilizer application for rainfed ragi

Treatment	Grain yield (kg/ha)	Percentage over control	Economics due to fertilizer application		
			Additional yields (kg/ha)	Cost of fertiliser (Rs.)	Net income (Rs.)
Nitrogen					
0 kg/ha	269	—	—	—	—
45 kg/ha	1076	299	807	144	663
90 kg/ha	1784	562	1515	288	1227
135 kg/ha	2357	774	2088	438	1656
Phosphorus					
0 kg/ha	1225	—	—	—	—
22.5 kg/ha	1366	11.7	141	99	42
45.0 kg/ha	1479	20.9	254	198	56
Potassium					
0 kg/ha	1252	—	—	—	—
22.5 kg/ha	1348	7.7	96	30	66
45.0 kg/ha	1469	17.2	217	60	157

(iv) **Maize :** At Paiyur, an experiment was laid out in a split plot design to assess the effect of pre-treatment of maize seeds and depth of sowing on the yield of rainfed maize during kharif season, 1979.

The results indicated that the pre-treatment of maize seeds had no significant influence on grain yield. However, there was a numerical increase of 196 kg of grain yield per ha with water soaked treatment. Sowing the maize seeds at 7.5 cm depth recorded significantly higher grain yield of 2115 kg per ha than sowing at 5.0 cm depth (1543 kg/ha) and 2 5 cm depth (1370 kg/ha) (Table 8).

TABLE 8. Effect of pre-treatment and depth of sowing on the grain yield of maize.

Treatment	Grain yield (kg/ha)
Main plot	
Control (No pre-treatment)	1624
Soaking in water for 16 hr before sowing	1820
Soaking in KH_2PO_4 solution for 16 hr before sowing	1663
Pre-treatment with pesticides (Furadon)	1601
C.D.(5%)	Not significant
Sub plot	
Sowing at 2.5 cm depth	1370
Sowing at 5.0 cm depth	1543
Sowing at 7.5 cm depth	2115
C.D.(5%)	208

(v) **Wheat :** Among the varieties tested NI 5439 was best suited for early sown condition (late October) giving an yield of 36.2 Q/ha and variety APAU 1560 for late sown condition (late November) giving an yield of 29.? Q/ha.

B. **Pulses**

(i) **Redgram :** An experiment was conducted at Coimbatore to study the response of redgram (Co.3) to foliar application of Diammonium phosphate and urea. Foliar application of urea at 9 kg N/ha at the time of flowering gave similar yield (2001 kg/ha) as with application of Diammonium phosphate to suppy 18 kg N/ha, 50 per cent basally as soil application and 50% as foliar application at flowering (2079 kg/ha).

(ii) **Cowpea :** An experiment was conducted at Coimbatore during summer and South West monsoon season of 1978, to study the response of cowpea (CO. 3) to application of P_2O_5 and growth regulators. The results indicated that the application of 25 kg P_2O_5/ha and foliar spray of planofix at 40 ppm gave the highest yield (896 kg/ha) and net income (Rs. 1742/ha).

C. **Oilseeds**

(i) **Sesamum :** In a mixed cropping study of sesamum with pulses in 1 : 1 and 2 : 1 ratios conducted at Coimbatore indicated that raising mixed crop of sesamum with pulses recorded higher yield than raising a pure crop of sesamum.

(ii) **Groundnut :** In the study on the effect of drum rolling on groundnut yield conducted at Aliyarnagar it was observed that the practice of earthing up of groundnut crop POL. 2 on 45th day after sowing registered high pod yield of 1187 kg/ha and was on par with rolling empty drum on 40, 50 and 60th days after sowing which recorded 1161 kg/ha. These were significantly superior to other treatments.

In another trial on constraints in crop management and their effect on groundnut, adopting the recommended seed rate 135 kg/ha (kernels), improved variety POL. 2, fertilizer dose of 15 : 30 : 45 kg/ha of NPK and prophylactic plant protection measure were found to be superior.

An experiment was conducted at Bhavanisagar to find out the optimum water requirement with graded doses of P_2O_5 for groundnut variety POL.2 during January-April. The treatments consisted of three levels of irrigations at 0.60, 0.75 and 0 90 IW/CPE ratio and four levels of P_2O_5 viz., 0, 20, 30 and 40 kg/ha. The results showed that irrigation at IW/CPE ratio 0 9 gave significantly higher yield of 2250 kg of pods/ha with 12 irrigations, but on par with 0.60 IW/CPE ratio with 2038 kg of pods/ha with 8 irrigations at interval of 10 days. At 0 6 IW/CPE ratio the consumptive water was less and water use efficiency was more.

Hence for POL. 2 groundnut grown during January-April, irrigation once in 10 days can be recommended.

To work out the economics of suitable package of practices for rainfed groundnut an experiment was laid out at Paiyur during kharif 1979 to demonstrate the low cost technology practices such as dibbling in lines, treatment with rhizobial culture, application of 75 per cent of STL recommended nitrogen dose and integrated weed control in comparison with farmers method of practices. A saving of Rs. 62/ha in cost of cultivation with a net profit of Rs. 328/ha were obtained by following the low cost technology practices, whereas a net profit of Rs. 95/ha only was possible under farmers method of practices.

(iii) **Sunflower :** An irrigation experiment was conducted in summer at Bhavanisagar and in South-West monsoon season at Coimbatore during 1978, with variety EC. 68413.

The results indicated that irrigation at IW/CPE ratio of 0.90 was optimum in both the seasons. This required an interval of eight days in summer and ten days in the South-West monsoon (Table 9).

TABLE 9. Effect of water management on grain yield and water use efficiency in sunflower

Treatment	Grain yield (kg/ha)		Water use efficiency (kg/mm/ha)		Water requirement (mm)	
	Summer	Monsoon	Summer	Monsoon	Summer	Monsoon
Farmers method of irrigation	1267	1512	1.99	3.20	638	473
Irrigation at 60% ASM in the active root zone	1472	1720	2.27	3.65	648	471
Irrigation at IW/CPE ratio of 0.60	1087	1333	2.30	4.09	472	326
Irrigation at IW/CPE ratio of 0.70	1290	1525	2.26	3.61	571	422
Irrigation at IW/CPE ratio of 0.90	1457	1705	2.28	3.68	639	463
Irrigation at IW/CPE ratio of 1.05	1487	1687	2.07	3.04	718	553
C. D. (5%)	139	129	0.11	0.15		

ASM - Available Soil Moisture.

To study the effect of time of harvest on yield and germination of seeds, the experiment was conducted for three years at Bhavanisagar and the results revealed that harvesting the crop at physiological maturity stage (when back of the head turns yellow) recorded the maximum seed yield of 1692 kg/ha. The results of germination test conducted on 30th and 60th day after harvest revealed that maximum germination was recorded on 60th day after harvest in all the treatments confirming that the seeds require a dormancy period of about 45 days to get good germination. The oil content was not influenced by different stages of harvest.

An irrigation experiment was conducted at Bhavanisagar with three levels of irrigation viz., 0.60, 0.75 and 0.90 IW/CPE ratio and four levels of W viz., 0, 20, 40 and 60 kg/ha with a basal dose of 60 kg P_2O_5 and 40 kg K_2O/ha on sunflower EC. 68414. There was no significant difference in yield due to irrigation levels. 40 kg N/ha gave significantly higher yields (902 kg/ha) than other N levels. Irrigation at 0.60 ratio with the total 7 irrigations at 10-12 days interval which gave the highest water use efficiency seems to be optimum for sunflower EC. 68414.

(iv) **Safflower :** A mixed cropping study on Safflower conducted under rainfed condition in north-east monsoon at Coimbatore indicated that Safflower + Bengalgram in 1 : 2 ratio gave highest total yield and net return. Hence mixed cropping of safflower with bengalgram is more profitable than raising either of these crops alone (Table 10).

TABLE 10. Effect of mixed cropping on grain yield of safflower

Treatments	Ratio	Yield (kg/ha)	Monetary value (Rs/ha)
Safflower (S)	Pure	1071	1999
Bengalgram (B)	Pure	1081	2715
Horsegram (H)	Pure	1099	1643
Safflower + Bengalgram	1 : 2 (S : B)	891	1045
		789	1972
Safflower + Bengalgram	1 : 5 (S : B)	687	801
		641	1552
Safflower + Horsegram	1 : 2 (S : H)	742	883
		525	787
Safflower + Horsegram	1 : 5 (S : H)	548	646
		665	998

D. Fibre Crops

*(i) **Cotton :** A field experiment was conducted in winter season of 1978* with MCU. 9 at Coimbatore, to find the effect of chemical defoliant on seed cotton yield.

as planofix twice, once at flower initiation and again 15 days later, gave the maximum seed cotton yield (Table 11).

TABLE 11. Effect of NAA on seed cotton yield (kg/ha)

Treatment	Seed cotton yield (kg/ha)
No spray	1447
Water spray twice at flower initiation and another 15 days later	1449
10 ppm NAA as planofix twice, one at flower initiation and another 15 days later	1542
20 ppm NAA -do-	1627
30 ppm NAA -do-	1716
30 ppm NAA as planofix at flower initiation followed by 20 ppm 15 days later	1713
C. D. (5%)	73

In the planting pattern and intercropping studies conducted at Kovilpatti in cotton, the monetary returns from the base crop of cotton and that of inter-crops revealed that growing two rows of blackgram in between paired row planting of cotton was significantly superior over other treatment combinations with a gross monetary return of Rs. 2370/ha and a net profit of Rs. 1017.60/ha.

In the maximum yield potential trial MCU 6 recorded the maximum yield of 443 kg/ha of cotton seed under improved cultural practices with recommended fertilizer plant protection and NAA spray with an increase of 94 per-cent over normal local practices.

Experiment was conducted to study the agronomic requirement of new varieties in relation to their plant densities and fertilizer levels. Variety C.50 recorded the maximum yield of 274 kg of seed cotton/ha as against 203 kg/ha. by MCU 6. Monsoon sowing was superior to pre-monsoon sowing. The spacing of 45 cm x 20 cm was superior to 45 cm x 30 cm. The application of 20 kg N and 10 kg P_2O_5/ha recorded the maximum yield of 250 kg/ha.

Among the eight varieties tested (viz., C 50, C 1412, CP 15/2, LH 299, SRT 1, DS 59, MCU 6 and Laxmi) LH. 299 was significantly superior to other varieties in recording the yield of 696 kg/ha of seed cotton which was 170 per cent increase over the check MCU 6. Nitrogen at 30 kg/ha was optimum to get economic yield.

In the different methods of planting and intercultural practices adopted for efficient utilization of moisture in rainfed cotton, paired row planting with opening furrow between paired rows and tying the ridges by 15th November has registered the highest seed cotton yield of 388 kg/ha with 76 per cent increase over control.

At Madurai for summer cotton MCU 7, scheduling of irrigation at 0.75 IW/CPE ratio is optimum for getting seed cotton yield when the crop is mulched with sorghum straw at 5 tonnes/ha. This was on par with 0.90 IW/CPE ratio without mulch. By applying mulch there was a saving of 18 cm of water (3 irrigations).

3. **Cropping Systems**

(i) **Multiple cropping :** With an objective of maximising the production and income from an unit area under rainfed conditions, ten combinations of multiple crops were compared in a randomised block design during kharif 1979. The crops included cereals, pulses and oilseeds. Among the ten crop combination studied, groundnut-sunflower gave the maximum income of Rs.1891/ha in 97 cropped days with a per day income of Rs.19.50. The next best crop combination was Sunflower + Greengram which gave a net income of Rs.1784/ha in 83 cropped days with per day income of Rs.21.50. Maize introduced as a crop under rainfed conditions did not fare well.

A multiple cropping experiment was conducted in gardenland condition at Coimbatore to select a profitable cropping system and to study the possibility of sowing fertilizer input without reducing productivity. Among the systems tested, sorghum + greengram — cotton + onion — radish — blackgram system was the most profitable. If the facilities for marketting the vegetable (radish) do not exist the system ragi — cotton + onion — sorghum + lab-lab could be recommended. In all the intensive cropping systems, 25 percent of fertilizer N, P and K can be saved by incorporating the residues of the crops and by including the legumes in the system (Table 12).

An investigation was conducted to study the performance of 5 rice based cropping systems, under 3 fertility levels in the wetland at Coimbatore.

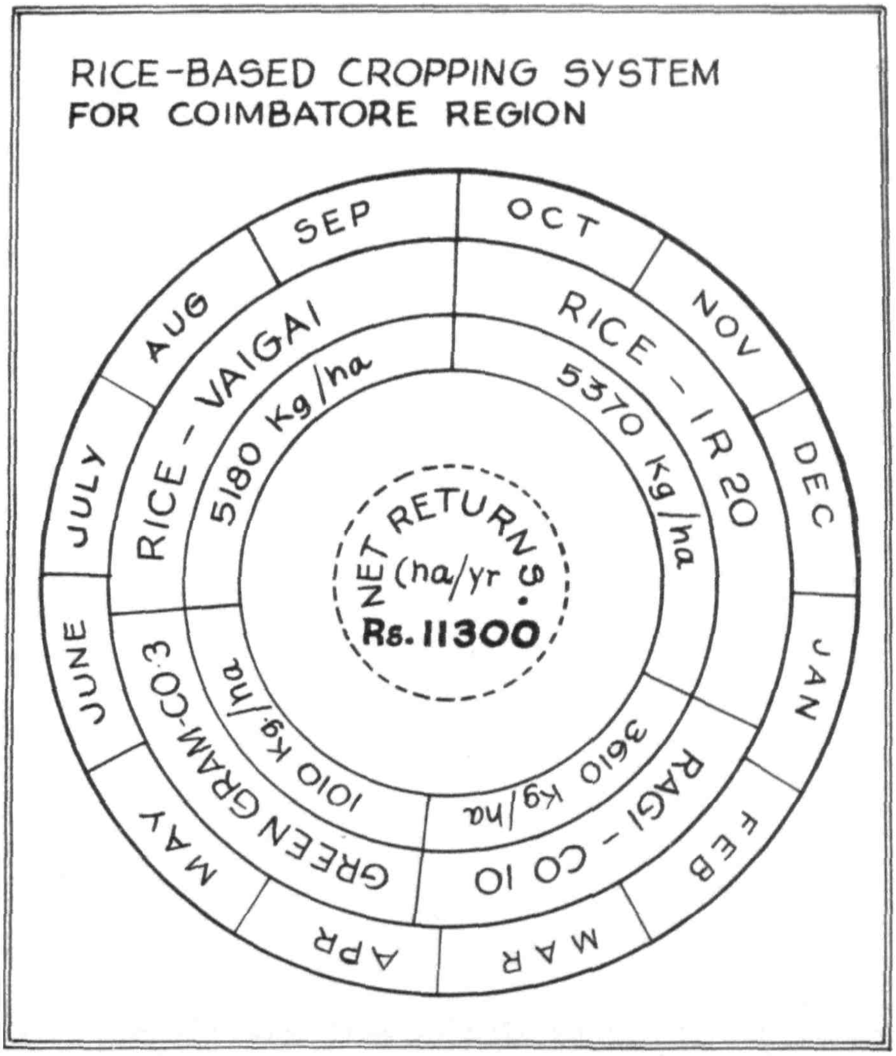
The cropping systems tested were

C1 — Rice — Rice — Rice
C2 — Rice — Rice — Sorghum + Cowpea
C3 — Rice — Rice — Ragi — Greengram
C4 — Rice — Rice — Maize + Soybean
C5 — Rice — Rice — Cotton + Blackgram

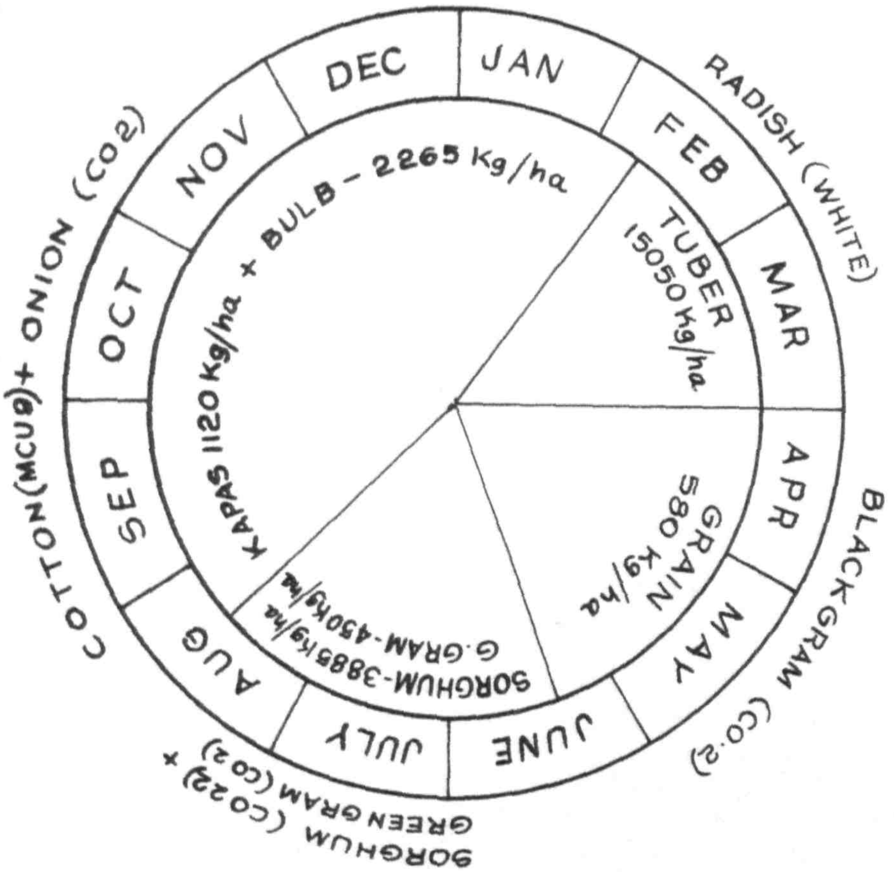
The fertility levels were

F1 — Full recommended dose of NPK applied to each crop
F2 — Half the recommended dose of NPK applied to each crop
F3 — Full recommended dose of P and K applied to each crop and recommended dose of P and K applied to summer crop only

Taking into account the yield, economics and soil fertility aspects, Rice-Rice - Ragi - Greengram (C 3) system was the best of all systems tested giving a


RICE-BASED CROPPING SYSTEM
FOR COIMBATORE REGION
SEP
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUNE
JULY
AUG
RICE - VAIGAI
5180 Kg/ha
RICE - IR 20
5370 Kg/ha
RAGI - CO 10
3610 Kg/ha
GREEN GRAM-CO 3
1010 Kg/ha
NET RETURNS.
(ha/yr
Rs. 11300

COTTON-BASED CROPPING SYSTEM FOR COIMBATORE REGION



NET INCOME – Rs. 12.900 / ha / YEAR

net income of Rs. 11,300/ha/year. Application of recommended level of N to all the crops and recommended level of P and K to summer crop only in the system (F3) would be sufficient. By adopting such a fertility management practice, there was a possibility of saving about 100 kg each of P_2O_5 and K_2O/ha/year.

TABLE 12. Effect of different cropping system on the yield and net return

C.No.	Systemic crop	Variety	Field duration (days)	Yield of economic produce (kg/ha)	Net return (Rs/ha)	Total net return for the system (Rs/ha/yr)	Return per rupee invested (Rs.)
I.	Ragi	CO. 10	75	2270	320		
	Maize (Fodder) +						
	Cowpea (Fodder)		85	12750+6700	1225		
	Cowpea	Local					
	Wheat + Mustard	HD. 2189+					
		Local	95	1415+195	445		
	Greengram	CO. 2	65	605	210		
	Radish (Relay)	While	45	12800	3795	5995	1.78
			365				
II.	Bhendi	CO. 1	80	3220	110		
	Sunflower (Relay)	EC. 101495	85	1705	525		
	Blackgram (Relay)	CO. 2	65	550	210		
	Wheat + Mustard	HD. 2189					
		local	95	1250+205	315		
	Sorghum (Fodder)						
	Cowpea (Fodder)	Local	70	12900+6900	1600	2760	1.57
			365				
III.	Sorghum +	CO. 22 +	90	3885+450	2425		
	greengram	CO. 2					
	Cotton + Onion	MCU. 9+	165	1120+2265	4865		
		CO. 2					
	Radish	While	45	15050	5350		
	Blackgram	CO. 2	65	580	260	12900	3.23
			365				
IV.	Ragi	CO.10	75	2050	290		
	Cotton+Onion	MCU9+CO.2	165	1135+2175	4850		
	Sorghum+Lablab	CO.22+CO.9	100	3090+ 720	1720	6860	2.03
			340				

(ii) **Mixed farming :** With an objective of maximising net income and employment for marginal farmers of Paiyur area by introducing mixed farming practices, different types of mixed farming practices linking dairying and poultry keeping either singly or both along with cropping, were compared with pure cropping system. The cropping patterns were formulated to fit in the marginal farmers holding size of 2 acres taking into consideration the feed requirements

of livestock and food requirement of the farmer. The dairy unit consisted of three cows and poultry unit six layers.

The results indicated that (Table 13) the mixed farming practice linking dairying was most remunerative which gave the highest net income of Rs. 2956/year with per day net income of Rs. 8.10 in comparison with pure cropping system, which gave an annual net income of Rs. 870 only, with per day net income of Rs. 2.38. The other best mixed farming practices in the order were linking dairying plus poultry keeping and linking poultry-keeping alone, which recorded annual net income of Rs. 1,913 and Rs. 743 and per day net income of Rs. 5.24 and Rs. 2.04 respectively. The output-input ratio was also higher in the mixed farming practice linking dairying (1.46) compared to pure cropping system (1.32).

The additional employment generated to the marginal farmer was 207 man days in mixed farming system linking dairying and poultry-keeping, 190 man days in mixed farming linking dairying and 37 man days in mixed farming linking poultry-keeping over pure cropping system. Therefore, mixed farming linking dairying could profitably be advocated to marginal farmers for assured income and employment.

TABLE 13. Economics of mixed farming and additional employment generated

Mixed farming practices	Value of output (Rs.)	Value of input (Rs.)	Net income (Rs.)	Per day net income (Rs.)	Input output ratio	Employment in man days	Addl. employment over cropping alone
I. Cropping + Dairying	9406.30	6450.30	2956 00	8.10	1.46	513	190
II. Cropping + Poultry-keeping	3394.53	2651.06	743.47	2.04	1.28	361	37
III. Cropping + Dairying + Poultry-keeping	8181.51	6268.78	1912.73	5.24	1.31	530	207
IV. Cropping alone	3563.09	2692.79	870.30	2.38	1.32	323	–

4. Weed Management

An experiment conducted in the farmers field near Coimbatore indicated that application of 2, 4-D at 1 kg a.i./ha combined with late hand weeding effectively controlled parthenium in the sorghum fields. The cost of weeding in this treatment was Rs. 191/ha. Hand weeding also effectively controlled parthenium, but the cost of weeding was a little higher i.e. Rs. 252/ha. The grain yield of sorghum was on par in both the treatments (4273 and 4540 kg/ha respectively).

SOIL SCIENCE AND AGRICULTURAL CHEMISTRY

The Department of Soil Science and Agricultural Chemistry has been conducting research at the Coimbatore and Madurai campus and also in the Regional Research Stations attached to the Tamil Nadu Agricultural University on the following aspects of soils, plants and fertilizers : Problem soils in relation to uptake of nutrients by plant; studies on soil nutrients; residual effect of different pesticides in crop plants; effect of green matter production and leaf protein content in lucerne; effect of intensive cultivation of crops, particularly paddy, on the physico-chemical properties of soil etc. Some of the salient findings on the above aspects are summarised below :

1. Problem Soils

A study on magnesium in acid soils of Nilgiris was conducted to find out the status and distribution of different forms of magnesium in the soils; the influence of magnesium on various physico-chemical properties of soils; the depthwise distribution of the various discrete forms of magnesium so as to evaluate the pedogenic process, the release pattern and the critical level of magnesium in the soils. The results revealed the following :

Total Mg obtained by summing up the four fractions of Mg viz. mineral Mg, acid soluble (reserve) Mg, exchangeable Mg, and organically complexed Mg was found to be as good as separate estimation of total magnesium. This was evidenced by a very close correlation coefficient of $r = 0.975^{**}$ $(n = 147)$ between the two methods, (b) wide variations in total Mg (2.5 to 13.3 me/100 g soil) contents of the Nilgiris soils depended largely on rainfall, elevation, parent material, clay content, organic carbon, pH, total acidity and exchangeable H, (c) Based on the profile and morphological characteristics, the soils of Nilgiris were classified into the following eight taxonomical subgroups : (i) Typic Palehumults; (ii) Typic Haplohumults; (iii) Typic Hapludalfs; (iv) Ultic Hapludalfs; (v) Typic Paleudalfs; (vi) Plinthic Paleudalfs; (vii) Typic Haplumbrepts and (viii) Fluventic Haplumbrepts and (d) One normal ammonium acetate (pH 7.0) proved to be the best among the thirteen extractants studied for the estimation of exchangeable Mg.

A pot experiment was conducted to study the availability and uptake of Zn by rice under the influence of organic and inorganic amendments in a highly sodic soil collected from Kangayam and the results showed that application of pressmud (30 t/ha) recorded the maximum grain yield increase of 57 per cent over control. Use of gypsum, H_2SO_4 and $Al_2(SO_4)_3$ also gave yield on par with press mud. A pot study was carried out in a Zn deficient soil (Perur) to study the effect of different types of sources and methods of application of zinc for rice (Var. Bhavani) and the results showed that the zinc deficiency of rice can be overcome by seed soaking procedure (0.1 per cent Zn-EDTA or 1.0 per cent $ZnSO_4$ for 24 hours) which compared favourably with the soil application of 5 ppm of zinc.

In a study with two non-saline sodic soils from Bhaganeri and Kariyapatti of Ramnad District to study the effect of gypsum and organic amendments on the soil properties, yield and uptake of nutrients by IR. 20 rice, combined application of gypsum at 50 per cent requirement and press mud at 15 t/ha reduced the pH of the soil from 9.8 to 7.6. Press mud was found to be very effective in reducing the pH. Application of gypsum and organic amendments reduced the exchangeable sodium and increased exchangeable Ca and Mg and available N and P. Application of gypsum recorded increasing yield of rice grain but the highest yield of grain was obtained by combined application of gypsum at 25 per cent requirement and press mud at 22.5 t/ha.

Under the scheme for studies on the physico-chemical properties of saline sodic soils with special reference to the uptake of macro and micronutrients, an experiment involving "Soil amelioration technique" for use of saline water (EC 6.8 mmhos/cm) for irrigation on a saline soil of Adivalli in Coimbatore district (EC 4.1 mmhos/cm) with radish as test crop was conducted. Application of pressmud (30 t/ha) resulted in 181.2 q/ha of wet radish tuber yield as compared to 131.3 q/ha recorded under control (Table 14).

TABLE 14. Tuber and foliage yield of radish (q/ha) as influenced by addition of different soil ameliorants

Treatments	Wet Tuber yield	Wet foliage yield
Control	131.3	337.0
Pressmud (30 t/ha)	181.2	432.6
Gypsum (6 t/ha)	151.1	369.7
KNO_3	140.6	334.3
Super (320 kg/ha)	172.9	425.5
Potash (300 kg/ha)	170.0	367.3
Ca + Mg prepared mixture	163.5	408.4
Pressmud + gypsum	176.1	410.3
S.E.	9.0	15.0
C.D.	27.0	44.0

In a study conducted to test the efficacy of different combinations of available amendments viz., gypsum, pressmud, farm yard manure (FYM), zinc sulphate, ferrous sulphate and aluminium sulphate, gypsum and pressmud were found to be effective in the reclamation of alkali soil and their combination was always found to be superior for the soil reclamation. Application of half of the gypsum requirement and half the dose of pressumud (15 t/ha) was found to be superior compared to applying these two amendments at full rate individually.

2. Soil Physical Properties

Studies on the effect of different mulches on crop growth, yield and properties of soils with sorghum (CSH.5) as the test crop have revealed that cumbu straw mulch snd sugarcane trash mulch recorded higher yields than black polythene sheet mulch. Application of 135 kg N, 45 kg P_2O_5 and 45 kg K_2O/ha recorded maximum grain and straw yields. Sugarcane trash conserved more moisture than other mulches.

In a study to find out the mobility of nutrients and physical properties of soil due to sewage irrigation, the results indicated that the water holding capacity, aggregate stability and stabilty index were improved upto 45 cm depth.

Profile studies on physical properties made in Tiruchirapalli district representing Madukkur, Pattukottai, Mudukulam, Tiruchengodu, Thondipatti, Govindapuram and Turaiyur soil series revealed problems of poor drainage and infiltration in Govindapuram and Turaiyur series only.

Estimation of field capacity by field draining method, modified Boyoucos method and by draining of core samples revealed that Boyoucos method recorded closer values to the field draining method than draining of core samples. The infiltration rate studies carried out with different sizes of double ring showed that with decrease in size of the rings, the infiltration rate also decreased.

Investigation on recycling of organic wastes on the physical properties of soil and yield of crop with treatments consisting of sugarcane begasse, farm yard manure, groundnut husk, pig manure and green leaf manure with cholam (CSH.5) and cumbu as test crops, revealed that sugarcane begasse and groundnut husk improved the capillary and non-capillary porosities of the soil. All the organic amendments improved physical properties like aggregate stability and stability index.

In a study on soil water movement under different irrigation regime, it was noticed that the soil layers, below 60 cm depth, had higher retentive capacity and was found to be related to the texural composition.

In a study to find out the effect of coconut coir waste on soil physico-chemical properties, incorpration of coir dust at 15 t/ha had increased the grain and straw yield of sorghum besides improving the soil.

3. Soil Chemical Properties

The results of the study to find out the loss of N by ammonia volatilization, under varying soil conditions with different N carriers indicated that the losses of N by volatilization of ammonia from alluvial, black, laterite and red soils under submergence were 4.54, 4.10, 0 27 and 5.91 per cent of added N as

ammonium sulphate respectively. The corresponding losses from urea were 17.87, 12.90, 15.17 and 26.04 per cent. The red soils recorded the highest loss of N from both the N sources which may be due to high pH, low EC and light texture.

Application of different organic manures as sources of nutrients to sorghum (CSH. 5) increased the grain yield and found to be as efficient as that of inorganic fertilizers. The soils registered an increase in the available N, P, and K and also organic carbon due to the application of organic wastes/manures.

Delineation of micronutrient deficient regions in Thanjavur district was taken up. Analysis of 1024 samples showed that Zn was highly deficient in Thanjavur district (98.3 per cent) followed by copper (40.6 per cent), iron (7.2 per cent) and manganese (0.9 per cent).

In a series of soil chemical studies carried out on the effect of inorganic fertilizers on soil properties, it was found that there was a build up of phosphorus in the soil due to the continuous application of 80 kg P_2O_5/ha. Such a build up was not there in the case of nitrogen and potassium, but on the other hand there was a decrease in the contents of these (Table 15).

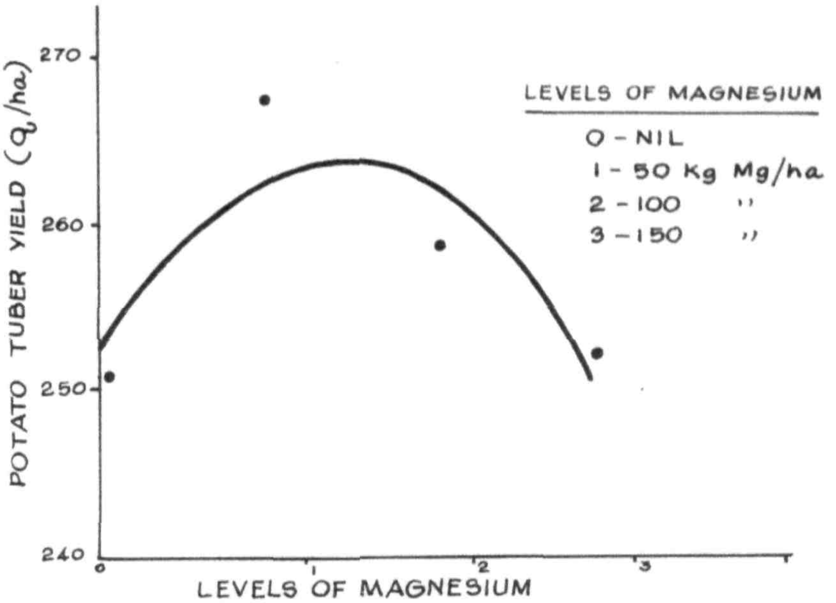
TABLE 15. *Effect of inorganic ferrilizers on the N, P and K status of soil*

Treatment	Available nutrients (kg/ha)		
	N	P	K
Initial status	186	11.2	185
$N_0P_0K_0$	119	6.9	163
$N_1P_1K_1$	138	8.8	140
$N_2P_2K_1$	113	12.4	157
$N_3P_2K_1$	130	13.7	163

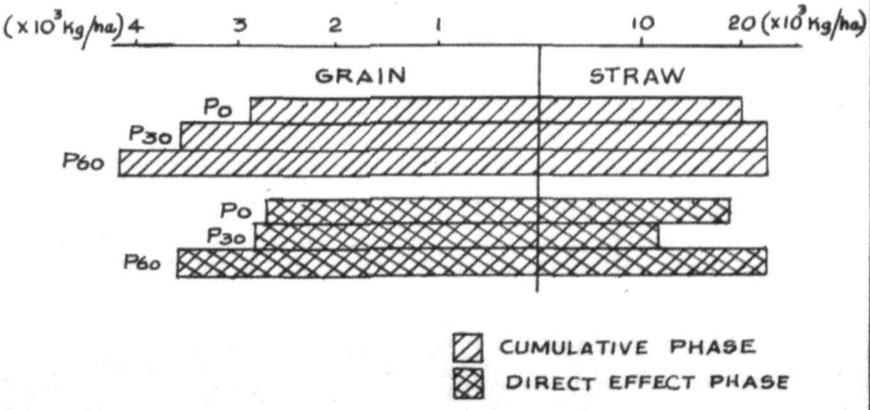
In another study, carried out to find out the effect of FYM and inorganics, alone and in combination, the results revealed that soil available N increased by 135 per cent due to continuous application of inorganics alone, while the P content was improved only by the combined applications of FYM and inorganics and K content by FYM alone. The organic carbon content registered an increase only in the FYM treatment (Table 16).

TABLE 16. Effect of FYM and inorganics on the N, P, K, and organic carbon status of soil

Particulars	Available nutrients (kg/ha)			Organic carbon per cent
	N	P	K	
Control	206	7.28	235	0.120
FYM alone	225	6.72	350	0.137
FYM + Inorganics	239	8.19	278	0.126
Inorganic alone	278	5.81	182	0.129



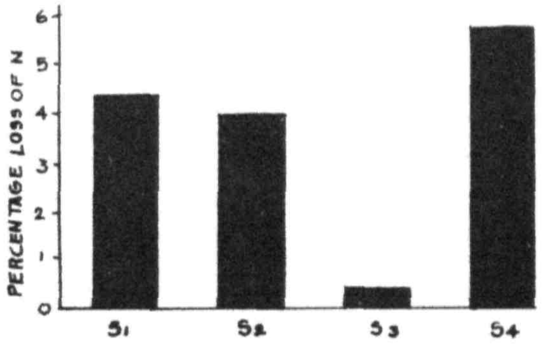
QUARDRATIC REGRESSION OF YIELD OF POTATO TUBERS ON LEVELS OF Mg.



YIELD OF SORGHUM (Var. CO 21) AS AFFECTED BY PHOSPHORUS AND MANURIAL PHASES

LOSS OF N IN PER CENT BY VOLATILIZATION OF AMMONIA UNDER FLOODED CONDITION

AMMONIUM SULPHATE



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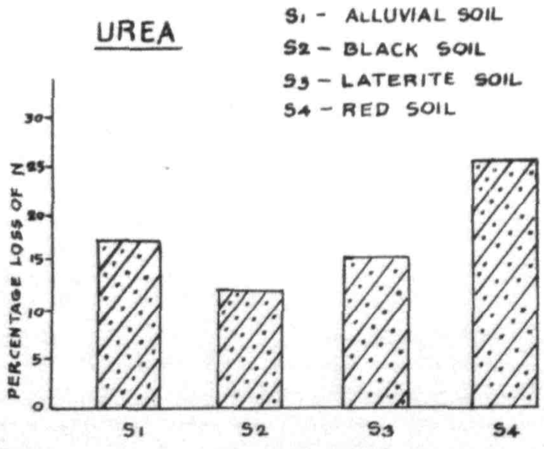

Under the Co-ordinated Scheme for investigation of Soil Tests with Crop Responses, investigations were carried out to (1) create fertility gradient in the selected fields for trials with high yielding varieties of crop, (2) find out the optimum levels of soil fertility for maximum yield of crops, (3) evolve a basis for making specific fertilizer recommendations based on soil test values for the new high yielding varieties, (4) find out the equivalence of fertilizer doses and soil test values in influencing the yield of crops and (5) screening various available methods of soil testing for best correlation with nutrient availability.

The following fertilizer adjustment equations have been developed for adoption.

(i) **Soil - Noyyal Series - Crop : Rice IR. 20**

FN	=	7.94 T - 0.46 SN
FP_2O_5	=	1.46 T - 3.73 SP
FK_2O	=	3.01 T - 0.11 SK
T	=	Targetted yield (Q/ha)
FN	=	Fertilizer N
FP_2O_5	=	Fertilizer P_2O_5
KF_2O	=	Fertilizer K_2O
SN	=	Soil N - alkaline $KMnO_4$ (kg/ha)
SP	=	Soil P - Olsen's P (kg/ha)
SK	=	Soil K - N. NH_4OAc-K (kg/ha)

(ii) **Soil - Irugur Series - Crop : Groundnut POL. 2**

FN	=	13.74 T - 0.86 SN
FP	=	5.08 T - 3.19 SP
FK	=	8.65 T - 0.31 SK

(iii) **Soil - Noyyal Series - Crop : Rice Var. Bhavani**

FN	=	4.397 T - 0.6719 SN
FP_2O_5	=	2.83 T - 6.11 SP
FK_2O	=	1.41 T - 0.32 SK

In a study to find out the effect of continuous application of micronutrients on the availability and build up of micronutrient status, the results indicated that after the 8th crop, significant increase in the contents of available zinc and copper was noticed. This increase was not observed in the case of iron.

In a study to find out the effect of intensive cultivation on chemical properties of soil, the results showed that after the 15th crop, available N contents registered an increasing trend with continuous N application. Similar build up in available phosphorus and potassium was also noticed.

4. Pesticide Chemistry

The cumulative residual effects of metasystox, nuvacron, metacid, thiodan, and zolone were studied in hill banana by spraying 13 rounds of the toxicants at monthly intervals and drawing samples one, two and three weeks after final spray and analysing for the residues. The residues of thiodan and zolone were not detectable while the residues in other cases were below tolerance level.

The mango samples drawn after 50 days of second spraying when analysed for the residues of dimecron, rogar, sumithion, metacid, fenthion, carbaryl, ekalux, anthio, fenthiocarb and FMC 35001, revealed that only in the case of other pesticides, the residues were below tolerance level.

Betelvine samples sprayed with metasystox, rogor, dimecron, monocrotophos and FMC 35001 from 0 02 to 0 04 per cent concentrations when analysed for the pesticide residues, they showed high residues in the begining but after 20 days the residues were below tolerance level indicating that leaves for consumption can be had only after 20 days of spraying.

The treatment of endosulfan, lindane, quinolphos, and phosalone as dust to blackgram did not leave any detectable amount of residues in grains. However the husks contained 0.80, 1.14 and 0.21 ppm of residues of endosulfan, lindane and quinalphos respectively at the time of harvest.

The groundnut crop, when sprayed with dichlorvos, monocrotophos, quinalphos, phosphamidan, phenthoate, diazinon, fenitrothion, fenthion, thimeton, phosalone and methyl parathion at 0.05 per cent concentration contained residues of monocrotophos, phenthoate, diazinon and methyl parathion and others did not leave any residues.

The rice variety vaigai, when treated with dimethoate, dichlorvos, fenitrothion, methyl parathion, phosphamidan, quinalphos, phosalone, chlorpyriphos, toxaphene and thiometon at 0.05 per cent spray concentrations did not contain any residues when hulled. However, the bran contained residues of fenitrothion phosalone and methyl parathion although in nontoxic concentrations.

5. Crop Nutrition

A. Cereals

(i) **Rice :** Field experiment conducted to study the effect of intensive cultivation of high yielding paddy varieties on physico-chemical properties of soil (Fifteenth crop of IR.20 was grown during this year with N at 0, 60, 120 and 180 kg/ha; P at 0, 30 and 60 kg/ha; and K at 0, 30 and 60 kg/ha) indicated that application of N at 180 kg/ha found to be optimum in increasing the grain and straw yield and also N uptake while application of P and K had no significant effect on the yield of grain and straw and on their uptake.

A fertility gradient experiment with rice (var. Bhavani) as the test crop was conducted in Tamil Nadu Agricultural University wetland soil (Noyyal series), using the fertilizer adjustment equation, yield targets and soil nutrient status. The fertilizer adjustment equations used are :

$$FN = 4.39\ T - 0.6719\ SN$$
$$F\ P_2O_5 = 2.83\ T - 6.11\ SP$$
$$F\ K_2O = 1.41\ T - 0.329\ SK$$

The results indicated that for 30, 45 and 60 q/ha of yield targets, the actual yields obtained were 42, 44 and 43 q/ha giving percentage achievements of 139, 96 and 72 respectively of the predicted yield.

Another fertility gradient experiment was conducted with rice (var. IR. 20) with five yield targets of 30, 35, 40, 45 and 50 q/ha using the following adjustment equations.

$$FN = 7.54\ T - 0.46\ SN$$
$$F\ P_2O_5 = 1.46\ T - 3.73\ SP$$
$$F\ K_2O = 3.01\ T - 011\ SK$$

The grain yields obtained were 39.5, 42.7, 43.0, 45.1 and 45.5 q/ha.

Two follow up trials were conducted in Farmers' holdings in Thukanaickenpalayam and Gobichettipalayam with rice IR. 20. The fertilizer adjustment equations tried were :

$$FN = 7.38\ T - 0.66\ SN$$
$$F\ P_2O_5 = 0.94\ T - 6.46\ SP$$
$$F\ K_2O = 2.56\ T - 0.18\ SK$$

The results showed that upto 45 q/ha, the yield targets could be achieved successfully adopting the fertilizer adjustment equations (Table 17).

TABLE 17. Actual yields and percentage achievements

Yield target (q/ha)	Thuckanaickenpalayam		Gobichettipalayam	
	Actual yield	% achievement	Actual yield	% achievement
Control	25.9	—	33.5	—
35	36.8	105	44.3	127
40	37.7	94	46.1	116
45	40.0	89	47.5	106
50	41.8	84	48.0	96
55	43.2	79	44.8	81

The follow up trials conducted at Aduthurai (3 experiments) revealed similar trends. At TNAU farm there were 116, 103, 91, 81 and 77 per cent achievements for the yield targets of 35, 40, 45, 50 and 55 q/ha respectively. At the farmers holding at Aduthurai the per cent achievements were 112, 102, 93, 86 and 80 for the yield targets of 40, 45, 50, 55 and 60 q/ha respectively. The trial conducted at Govindapuram, the per cent achievements were 115, 105, 101, 92 and 84 for the yield targets of 35, 40, 45, 50 and 55 q/ha respectively.

A field experiment was conducted to determine the micronutrient needs and to study the comparative responses of different crops to the application of zinc. The results indicated that apart from the favourable yield attributes, the number of filled grains per panicle was high. The grain yield data of CO. 41 rice showed that the plot which received $ZnSO_4$ and $FeSO_4$ at 25 kg/ha and 50 kg/ha respectively had recorded an yield of 2322 kg/ha over that of 1534 kg/ha in control, thus registering 54 per cent increase. Similar yield increase was recorded for Vaigai rice also (34.1 per cent increase over control).

An experiment carried out to determine the susceptibility or otherwise of ten varieties of rice viz., IR. 20, CO. 40, ASD. 15, Ponni, IET. 1722, Vaigai, TNAU. 17005, Bhavani, CO. 42 and CO. 39 to the application of zinc by different methos viz., soil application, seed soaking and root dipping, showed that both chlorophyll 'a' and chlorophyll 'b' increased with the application of zinc by seed soaking. TNAU. 17005 recorded maximum total chlorophyll content (4.03 mg/g) by seed soaking with 2 per cent $ZnSO_4$. However, root dipping with ZnO (2 per cent) produced more tillers. The nitrogenase activity was found to be more in CO. 40 rice with 2 per cent ZnO root dipping treatment. However, there was no difference in yield among the various treatments.

The experiment conducted to test the response of ten rice varieties (Vaigai, IET. 1722, CO. 39, Bhavani, Ponni, ASD. 15, TNAU. 17005, CO. 42, IR. 20 and CO. 40) to the application of zinc by different methods and sources showed that among the treatments, foliar spray of 0.5 per cent $ZnSO_4$ twice during the crop growth at 30th and 45th day after transplanting registered higher grain yield than the NPK treated control, but tended to fall on par with other treatments viz., soil application of $ZnSO_4$ at 50 kg/ha and root dippings in 2 per cent ZnO suspension. The varieties did not differ much.

To study the availability and depletion of soil nitrogen and the ways and means of increasing the availability of soil nitrogen, a pot study was conducted with IR. 20 rice as the test crop. The results revealed that residual effect of added nitrogen through fertilizer dose is very meagre and the same is insufficient to give a good crop yield in the next crop.

The results of a permanent manurial experiment conducted at Agricultural College and Research Institute, Madurai, indicated that highest yield of Bhavani (4308 kg/ha) was obtained by the application of 120, 60 and

60 kg/ha of N, P_2O_5 and K_2O respectively. In another field experiment, urea plus sulphur at the rate of 100 kg/ha with half a tonne of gypsum/ha recorded an yield of 4575 kg/ha over urea alone (3950 kg/ha) and ammonium sulphate alone (3650 kg/ha). Application of $ZnSO_4$ and $CuSO_4$ at 10 kg ha each significantly increased yield of Vaigai but combined application of $ZnSO_4$ and $CuSO_4$ did not influence the yield.

To find out the rate of mineralisation of slow acting fertilizers and also the nitrogen transformations as influenced by the nitrification inhibitors, two field experiments, one with rice IR. 20 as the main crop and another with rice IR. 20 as the residual crop, were conducted with twelve treatments. The yield of rice grain was 4808 kg/ha when 100 per cent of soil test recommended nitrogen (120 kg/ha) as urea was applied mixing with neem seed crush at the rate of 20 per cent of the fertilizer. This yield was 14.4 per cent more than the treatment which received 120 kg/ha N as urea without any treatment. Among the treatments viz., urea + neem extract, urea + neem cake and urea + neem seed crush, maximum yield increase was in the case of urea when mixed with neem seed crush.

A study was carried out to find out a suitable organic matter source in combination with phosphorus for efficient nitrogen fixation. Four varieties of straw viz., cholam, ragi, cumbu and paddy (alone and in combination with basic slag at 60 kg P_2O_5/ha) were tried. The results revealed that application of 10 tonnes of ragi straw along with 60 kg P_2O_5/ha as basic slag produced comparable grain yield (3957 kg/ha) with that of the yield obtained through conventional NPK fertilization (3879 kg/ha) and the yield increase was 29 per cent over control.

The study carried out to find out the rate of depletion of different forms of K under intensive relay cropping as influenced by the different levels of application of N and K, revealed that every increase in the application of N correspondingly increased the yield of rice grain and straw. The effect of K on the yield of rice, although significant, was not consistant (Table 18 and 19).

TABLE 18. Influence of N application on the grain and straw yield of Rice - IR 20.

Treatment	Fifth crop		Sixth crop	
	Grain yield (g/pot)	Straw yield (g/pot)	Grain yield (g/pot)	Straw yield (g/pot)
O—N	17.33	23.62	12.34	17.98
100 kg/ha	21.01	28.44	21.73	24.08
200 kg/ha	26.51	37.37	30.79	33.18
300 kg/ha	35.86	55.05	40.32	39.76

TABLE 19. Influence of K application on the grain and the straw yield of Rice-IR. 20

Treatment	Fifth crop		Sixth crop	
	Grain yield (g/pot)	Straw yield (g/pot)	Grain yield (g/pot)	Straw yield (g/pot)
No K_2O	25.14	34.82	25.75	28.67
50 kg/ha	21.04	35.48	28.51	28.83
100 kg/ha	26.00	37.05	26.70	29.42
150 kg/ha	24.90	35 20	26 51	28.08
200 kg/ha	28.81	38.10	23.99	28.67

Depletion of both exchangeable and water soluble K in the control plot was noticed with progressive increase in the number of harvests made. In the treatments receiving K there was corresponding steady and gradual increase of K in the soil.

Triacontanol spray at 0.1 mg/litre given on 30th day after transplanting of IR. 20 rice seedlings under pot culture condition significantly increased the yield of rice over that of NPK treated and lucerne hay soil applied pots. Nitrogen, phosphorus and potassium uptake values were found to be higher in the treatment which received triacontanol spray compared to other treatments tried. The increase in yield due to triacontanol spray ranged from 39 to 56 per cent over that of NPK treated plots.

(ii) **Sorghum:** A fertility gradient experiment was conducted at Agricultural Research Station, Bhavanisagar. Four graded doses of N, P_2O_5 and K_2O to represent 0, ½, 1 and 2 (viz., N-O, 75, 150 and 300 kg/ha, P_2O_5 - O, 45, 90 and 180 kg/ha and K_2O - O, 55, 110 and 220 kg/ha) were tried with a test crop sorghum CO 23. Highest yield was recorded in $N_2P_2K_2$ strip which received 300 kg N, 180 kg P_2O_5 220 kg K_2O/ha (grain yield was 61.2 q/ha and straw yield 193.6 q/ha).

In a study to find out the optimum quantity of N and K needed for CSH.5 sorghum and their influence on the quality, field experiments were conducted at four centres viz., Coimbatore, Bhavanisagar, Paiyur and Pondicherry. The grain and straw yields were not influenced either by the application of N or K at Coimbatore and Paiyur centres, while at Bhavanisagar there was significant increase in grain and straw yields at 150 kg N/ha. At Pondicherry centre only straw yield was influenced by K or N application. Further in case of Coimbatore centre, there was no influence on N, P and K uptake both by the grain and straw due to N or K applications. However, the NPK uptake values were significantly influenced in both grain and straw due to the application of N alone in the case of Bhavanisagar and Pondicherry centres, while P and K uptake values in sorghum grain at Bhavanisagar and Pondicherry centres and

N and K uptake values in sorghum straw at Pondicherry centre were significantly influenced by the application of K at each N level.

In a field experiment conducted to study the effect of continuous application of $ZnSO_4$, $CuSO_4$, and $FeSO_4$ on the yield of crops, application of $ZnSO_4$ at 12.5 kg/ha increased the grain yield of CSH.5 sorghum by 11.0 per cent over control Continuous application of $CuSO_4$ at both levels of 12.5 and 25 kg/ha marginally reduced the grain yields.

Control : 2200 kg/ha
$ZnSO_4$ (12.5 kg/ha) : 2450 kg/ha

Interaction effects of Zn x Cu, Cu x Fe and Zn x Fe failed to have any favourable influence on the yield of both grain and straw. In fact there has been a depressing effect due to the combined applications.

In order to study the nutrient uptake pattern in the mixed cropping, experiment was laid out with sorghum and pulses (redgram, lab-lab and cowpea). The results indicated that N uptake was high in sorghum + redgram treatment, while P uptake was found to be high in the pure stand of the sorghum crop. But the K uptake was not influenced by mixed cropping. The soil analysis data revealed that mixed cropping did not have any effect on the availability of major nutrients.

A field experiment, under soil test crop response project by inductive approach method, was carried out at Pappanaickenpalayam on a red colluvial soil belonging to Somayyanur series with sorghum CSH. 5 as the gradient crop. Four graded doses of fertilizers (N-0, 75, 150, 300 kg/ha, P_2O_5 - 0, 65, 130 and 260 kg/ha and K_2O - 0, 36, 72, 144 kg/ha) were applied. Highest grain yield (4835 kg/ha) and straw yield ('2444 kg/ha) were obtained in the strip $N_3P_3K_3$ which received 300 kg N, 260 kg P_2O_5 and 144 kg K_2O per ha, respectively.

In a study to find out the effect of P, K and FYM on yield and nutrition of sorghum grown in a fixed single year, two crop rotation, significant response to P was noticed in the cumulative and direct phases of manuring. In the cumulative phase, 21.1 and 40.1 per cent increased yield of grain for P applied at 30 and 60 kg/ha were obtained respectively. In the direct phase, the increase in yield over control were 2.4 and 35.8 per cent for 30 and 60 kg/ha respectively. When P was added continuously each level had its own significant response over P_0, while in the direct phase P_{60} level alone was superior to P_0, and P_{30}. There was no significant response for K and FYM applications (Table 20).

TABLE 20. Yield of sorghum (kg/ha)

Phases	Cumulative phase		Direct phase	
Level of P	Grain	Straw	Grain	Straw
No P	2866	19146	2644	18712
30 kg/ha	3471	21846	2707	20640
60 kg/ha	4015	21846	3538	21460
SE	126.8	386.2	96.2	NS
CD	363.8	1108.6	276.0	NS

(iii) **Maize :** In a field experiment to find out the effect of nitrification inhibitors under gardenland condition, Ganga 5 Maize was grown in the red loamy soil of millet breeding station with 15 different treatments (N at 135 kg/ha, P_2O_5 at 68/ha and K_2O at 45 kg/ha). The N was applied as urea mixed with neem cake or N serve. The results showed that there was no significant difference in yield between the untreated urea and urea mixed with inhibitors indicating the absence of beneficial effects of inhibitors under the gardenland conditions.

(iv) **Cumbu :** In a field experiment to find out the effect of P, K and FYM on yield and nutrition of cumbu grown in a fixed single year two crop rotation, significant response to P in all the three phases of manuring was noticed. P at 60 kg P_2O_5/ha. was on par with 30 kg P_2O_5/ha in the cumulative and direct phases while 60 kg P_2O_5/ha was significantly superior in the residual phase. The crop also responded to K in the cumulative phase only and to FYM in the direct and residual phases (Table 21).

TABLE 21. Response of cumbu to P application (Yield, kg/ha)

Levels of P	Cumulative phase		Direct phase		Residual phase	
	Grain	Straw	Grain	Straw	Grain	Straw
No P	548	2380	584	2909	469	2613
30 kg/ha	885	1957	933	2263	491	2173
60 kg/ha	1106	2074	943	2856	814	2631
SE	47.6	NS	32.8	76.4	43.4	NS
CD	136.8		94.3	219.4	124.7	

(v) **Ragi :** An experiment was conducted to study the effect of different sources of organic manures and micronutrients on soil properties and yield of ragi (CO.11) in a sandy loam soil at Agricultural College and Research Institute, Madurai. Available N, P, Zn and Cu increased by the application of organic manures such as pressmud, FYM and compost. Application of FYM or compost at 10 t/ha increased the yield of ragi grain and straw. Combined application of Zn and Cu each at 5 ppm with organic manures recorded the highest yield of both grain and straw. The content and uptake of N, P, K, Zn and Cu by grain and straw were increased by the addition of organic manure.

Under the Long Term Manurial Experiment, the yield data of the 13th crop of ragi (CO.7), 14th crop of cowpea (CO.1) and 15th crop of maize (Ganga 5) and their chemical composition and uptake of N, P, K, Ca and Mg revealed the following :

The treatment which received 100 per cent optimum NPK + 10 tonnes of FYM/ha recorded significantly higher yield of ragi grain and straw. The control and N alone plots recorded significantly very low yield and also there has been a declining trend in yield in these plots as compared to the previous crops.

The cowpea grain and stover yield data indicated that except control and N alone plots, all other treatments were found to be on par.

The yield trend of maize was found to be similar as that of ragi (100 percent optimum NPK + 10 tonnes of FYM) recording maximum yield.

When the yield of the past 15 crops (5 crops each of ragi, cowpea and maize) grown since 1972 were compared, the treatment which received 100 percent optimum NPK + 10 tonnes of FYM, was found to record consistently higher yield than 100 per cent and 150 per cent optimum NPK treatments. Addition of FYM invariably produced yield increases when applied in addition to 100 percent optimum NPK. Ragi was found to respond well for the FYM applications.

There was consistently significant response for N application for all the crops grown so far, but the quantum of response was found to decrease as period progressed. There was rapid decline for N response when the crops were grown with N alone.

The response of N was found to be increased many times when compared with phosphorus, but the quantum of response was not to that extent when combined with potassium.

Sulphur free sources of fertilizers (urea, ammonium phosphate and muriate of potash applied to supply 100 per cent optimum NPK) recorded higher yields than the sulphur containing sources, persumably due to the fact that the soil was already having enough sulphur.

The composition of grain and straw of ragi, cowpea and maize did not record significant difference in their contents of N, P, K, Ca and Mg due to the treatments.

B. Pulses

Investigations were carried out to find out the effect of added doses of superphosphate on the quality of pulse crops and also to evaluate the best method of superphosphate application. Two field experiments were conducted, one in red sandy loam soil and another in black soil with cowpea (CO.2), blackgram (CO.3) and greengram (CO.2) as the test crops. The results indicated that the P uptake increased with increasing levels of P_2O_5 only in the cowpea crop. But all the pulse crops recorded increased yield with P_2O_5 application and maximum yield were obtained for an application of 12.5 kg P_2O_5/ha (cowpea grain yield was 2200 kg/ha, blackgram 1690 kg/ha, and green gram 610 kg/ha). In the follow up crops, CSH.5 sorghum recorded increased yield in plots where cowpea and blackgram were raised previously. Ganga 5 maize recorded increased cob yield in plots where blackgram and greengram were raised and for the straw yield, blackgram and greengram plots registered better residual effect.

Studies on factors influencing nodulation, nitrogen fixation and quality of produce in different genotypes of blackgram were conducted. The results indicated that inoculation with rhizobia significantly increased the quantum of N in nodule. Application of 50 kg P_2O_5/ha recorded higher nitrogen content (0.80 mg/plant) at vegetative stage. Molybdenum at 0.1 ppm increased total N content of the soil by 10 per cent over control. Blackgram variety P. 123 recorded the maximum N content in the soil (708 ppm).

The seed yield of CO. 3 blackgram was increased significantly by the *application of $ZnSO_4$ at 25 kg/ha when super-imposed over the basal dose of NPK.* The increase in grain yield was 26 per cent over that of NPK treated control.

C. **Oil Seeds**

(i) **Groundnut:** A test crop trial with groundnut - POL. 2 under the soil test crop response project conducted at Agricultural Research Station, Bhavanisagar with 4 levels of N (0, 10, 20 and 30 kg/ha), 5 levels of P_2O_5 (0, 12, 24, 36 and 48 kg/ha) and 3 levels of K_2O (0, 25 and 50 kg/ha) indicated that maximum yield of 40 q/ha was produced by the treatment $N_2P_4K_2$.

To test verify the fertilizer adjustment equations for groundnut POL. 2, a trial was conducted at Bhavanisagar fixing five yield targets of 10, 15, 20, 25 and 30 q/ha. The adjustment equations used were for Irugur soil series.

$$FN = 13.74\ T - 0.86\ SN$$
$$FP_2O_5 = 5.08\ T - 3.19\ SP$$
$$FK_2O = 8.65\ T - 0.31\ SK$$

The percentage achievements were 125, 104, 85, 75 and 64 per cent of the respective targeted yield.

The field studies at two centres viz., Coimbatore and Paiyur, had revealed neither the application of N nor the application of K at each N level had any influence on the oil content in groundnut.

(ii) **Gingelly:** In order to study the effect of gingelly crop on the physico-chemical properties of soil, pot culture experiments were conducted in which application of 36 kg N/ha recorded higher yield than 18 and 54 kg N/ha and among the red and black soils tried, black soil was found to be superior. Reduced yield recorded at higher levels of N indicated, in contrast to the usual opinion, that gingelly is not an exhaustive crop. Among the two levels of P, the lower level viz., 20 kg P_2O_5/ha was found to be optimum than 40 kg P_2O_5/ha.

In an experiment conducted to study the influence of fertilisation, spacing and intercropping on nutrient and oil content of gingelly, it was observed that increased levels of N reduced the oil content. Application of N at 40 kg/ha

recorded higher N, P and K contents than that of 20 and 60 kg N/ha when P+K were applied at constant level of 25 kg/ha each.

Among the different intercrops, viz., greengram, blackgram and cowpea, grown in summer and monsoon seasons, N, P, K contents and oil content were high in gingelly + greengram mixture in summer and in gingelly + cowpea mixture in monsoon season.

Analysis of fifty seven genetic stocks for their oil content indicated high oil content in TC. 25, Type 12, PG 64, TC. 66, S. 1551, TMV. 21, SI. 1878 and ES. 423 (51.2 to 51.9 per cent) compared to the rest.

(iii) **Sunflower:** In the studies on comparative efficiency of different sources and methods of application of micronutrients, the seed yield of sunflower (EC. 68415) was significantly increased by foliar spray of 0.5 per cent $ZnSO_4$ thrice during the crop growth at 20th, 30th and 40th day, the increase in seed yield being 34 per cent over the NPK treated control.

In another experiment, at Agricultural Research Station, Aliyarnagar, sunflower (EC. 68414) responded to foliar spray of 0.1 per cent borax and the yield increase was 38 per cent over NPK treated control.

D. Fibre Crops

Cotton : In a study on the improvement of soil fertility as influenced by best crop rotation, the results of a field experiment with MCU. 5 cotton revealed that when the availability status of phosphorus and potassium was high 50 per cent of the blanket schedule of phosphorus and potassium can be saved without reduction in yield.

E. Tuber Crops

(i) **Potato:** In a study to critically evaluate the role of magnesium in crop production in the magnesium deficient areas of the Nilgiris, the results indicated that soil testing value of 2.3 me/100 g soil of 1 $\underline{N}$ ammonium acetate extractable (pH 7.0) Mg may be considered as the critical level for Nilgiris soils.

Application of 50 kg Mg/ha was found to be optimum in increasing the yield of crops under Nilgiris conditions. Potato tuber yield was increased by 17.6 q/ha by the magnesium application. The response was found to be quadratic. Besides the yield, the starch content also was found to be increased. The application of Mg was found to alleviate the adverse effects due to high K fertilization.

(ii) **Tapioca:** In a field study to find out the influence of potassium on the quality of tapioca, carried out at three centres, the results revealed that K application markedly increased the starch content over no K treatment in all the

varieties tried. Application of nitrogen at higher levels (75 kg/ha) considerably reduced the starch content of tapioca tubers compared to lower levels of N (Table 22).

TABLE 22. Mean values of starch content of tapioca as influenced by the application of N & K

Treatment	Mazhavella		CO. 1		H. 165	
	Coimbatore centre		Paiyur centre		Pondicherry centre	
	Starch per cent	Relative per cent of starch content	Starch content per cent	Relative per cent of starch content	Starch content per cent	Relative per cent of starch content
K_1N_0	71.45	100.00	71.90	100.00	70.90	100.00
N_1K_1	77.57	108.56	80.40	111.82	76.95	108.53
N_1K_2	85.35	119.45	81.65	113.56	83.80	118.19
N_1K_3	89.22	124.87	86.42	120.19	85.80	121.01
N_2K_0	68.52	100.00	74.10	100.00	67.12	100.00
N_2K_1	70.55	102.96	75.67	102.11	69.52	103.57
N_2K_2	80.57	117.58	87.77	118.44	79.80	118.14
N_2K_3	78.42	114.44	76.67	103.46	77.72	115.79
N_1	80.90	100.00	80.09	100.00	79.36	100.00
N_2	74.51	92.10	78.55	98.07	73.41	92.50

Levels of N : 50 and 75 kg/ha

Levels of K_2O for N_1 – 0, 50, 100 and 150 kg/ha

" N_2 – 0, 75, 150 and 225 kg/ha

F. Vegetables

In a study to find out the uptake of major nutrients by brinjal, experiment was conducted and the results showed that uptake of N, P and K progressively increased with the age of the crop. There was increased uptake of N due to N fertilization but P and K fertilization did not influence much in their uptake. A brinjal crop removed 88, 10 and 125 kg/ha of N, P and K respectively from the soil(Tables 23 and 24).

TABLE 23. Uptake of nutrients by brinjal at different stages

Stages	Nutrients kg/ha		
	Nitrogen	Phosphorus	Potassium
First picking stage	50.74	6.19	44.45
Peak picking stage	79.98	6.75	71.91
Final harvest	88.36	10.05	125.34

TABLE 24. Uptake of nutrients by brinjal as influenced by fertilization

Stages	Nutrients (kg/ha)						
	Nitrogen			Phosphorus		Potassium	
	N_0	N_{150}	N_{200}	P_0	P_{50}	K_0	K_{100}
First picking stage	43.98	57.64	50.28	6.09	6.29	44.97	49.94
Peak picking stage	76.41	85.77	77.51	6.35	7.16	70.49	73.33
Final harvest	87.94	89.64	87.49	10 02	10.07	125.24	125.45

G. Forages

Under All India Coordinated Project for Research on Forage crops, various forage crops viz., cowpea, sorghum, maize, guar, lucerne, napier grass etc. were evaluated for their chemical composition and nutritional qualities. Among the cowpea selections, varieties UPC. 979, Cowpea 74, C. 25, C. 30, C. 26 were found to contain higher dry matter content than the rest (16 to 18.34 per cent). Variety UPC. 979 recorded the highest protein content (19.38 per cent). Among the sorghum varieties, selection 472 was found to be superior with respect to both dry matter (27.12 per cent) and crude protein (9.38 per cent) contents. Among the maize selections, varieties Kissan and Humias composite had higher dry matter content while Comp. P. 53-54 had the highest crude protein (8.91 per cent). There was not much difference among the cowpea varieties tried. Guar HFG. 197 was found to be superior with 29.08 per cent dry matter and 22.71 per cent crude protein.

The dry matter content was found to increase with maturity of the lucerne crop from 22.41 (Ist cut) to 31.77 per cent (5th cut) and there after the contents decreased. The crude protein also showed a decreasing trend with the age of the crop and decreased from 21.32 (Ist cut) to 18.57 per cent (12th cut).

Application of N to hybrid napier grass was found to reduce the dry matter content while it had a favourable influence on the crude protein content in all the 9 cuttings. The dry matter content varied between 20 00 and 29.55 per cent. The oxalic acid content ranged from 1.848 to 2.680 per cent.

The varietal cum manurial trial on dinanath grass indicated that application of N (50 to 100 kg/ha) increased the crude protein and phosphorus contents and decreased the fibre constituents. The nutrient composition decreased with maturity of the crop, while fibre accumulation increased with maturity. All the treatments including varieties or levels and stages of cuttings significantly influenced the oxalic acid contents of this grass. Oxalic acid content increased with N levels from 1.94 (control) to 2.27 per cent (100 kg N/ha) and decreased with maturity from 2.65 (80 days) to 1.72 per cent (120 days). Variety Pusa 3 accumulated more oxalic acid (2.23 per cent) and IGFRI registered the minimum value (1.94 per cent).

The sesbania samples from the trial on the effect of row spacing and levels of P indicated that the dry matter content was not influenced by row spacing. Application of P significantly reduced the dry matter from 33.99 (control) to 29.73 per cent (90 kg P_2O_5) due to bush vegetation. P significantly increased the crude protein content from 17.45 (control) to 19.64 per cent (90 kg P_2O_5/ha).

To the study the effect of fertilizer application on green matter production and leaf protein content in lucerne, field experiments were conducted with the foliar spray of urea, ammonium sulphate, ammonium chloride, and ammonium nitrate at monthly intervals. Green matter yield and different forms of leaf protein were found to be favourably influenced by the foliar spray of urea and ammonium sulphate once in a month and once in two months.

H. **Spices and Plantation Crops**

(i) **Chillies:** In a study of the influence of added nutrients on the quality of chillies, the results indicated that addition of N lowered the capsicin content of MDU 1 chilli fruits, while N in combination with P and K, the capsicin content registered higher values The total uptake of N, K and Ca was found to be significantly influenced by the application of N, P and K, but not the uptake of P and Mg. Equal split application of 120 kg N with a basal application of 25 t/ha of FYM increased the yield of dry chilli pods and uptake of nutrients.

(ii) **Coffee:** A detailed study was undertaken on 35 soil and leaf samples from 12 Coffee Estates of lower Palani hills to establish the relationship between soil properties and nutrient contents in leaves. The soils were sandy clay and acidic in nature. The clay, organic matter, total and available N, and C : N ratio increased with elevation. The EC, available P and K and exchangeable Ca and Mg were found to be low in these soils. The soils had a high P fixing capacity. The values of N, P, K, Ca and Mg contents in coffee leaves ranged from 1.68 - 2.88, 0.1 - 0.21, 2.10 - 3.44, 0.7 - 1.92 and 0.21 - 0.68 per cent respectively. A significant positive relationship between leaf N and P, leaf K and total K were established.

6. **Fertilizers and Bio-fertilizers**

A study was conducted to find out the effect of urea and sulphur applications on yield of rice in comparison with ammonium sulphate and also to find out cheaper sources of sulphur and nitrogen as an alternative to ammonium sulphate. The test crop was rice IR 20. The results indicated that the treatment 120 kg N/ha as urea and 140 kg sulphur/ha as gypsum enhanced the yield from 2220 to 4000 kg/ha.

An incubation experiment was conducted with 4 soils using N-serve, AM and neem seed crush as the nitrification inhibitors. Rate of inhibition of nitrification was assessed analysing periodical samples for *Nitrosomonas* and *Nitrobacter* population. The results showed that the *Nitosomonas* sp. was inhibited

by N-serve to 82.6 per cent and by AM to 68.9 per cent. The *Nitrosomonas* activity was maximum in red soil and least in laterite soil. In the case of *Nitrobacter* sp, N serve was found to inhibit upto 31.7 per cent. Black soil had the maximum of *Nitrobacter* sp.

A field experiment was conducted to study the possibility and extent of use of *Azolla* as an alternative low cost nitrogen. The treatments consisted of 2 levels of urea and *Azolla* after transplanting with and without supplementation of nitrogen. The *Azolla* inoculated plots in general registered higher nitrogen and organic carbon contents and higher yield of grain than the plots receiving urea alone. Among the *Azolla* treatments, *Azolla* incorporation after full cover before transplanting with 30 kg of N as urea gave the highest yield.

AGRICULTURAL ENTOMOLOGY

The major efforts of the Department of Agricultural Entomology were concentrated around developing effective chemical measures against pests of crops like rice, millets, cotton, oil seeds, pulses, horticultural crops and also stored grain pests. Besides, investigations were also continued on screening of varieties of crops for resistance to major pests, biological control of crop pests using parasites and pathogens. Insecticide residues in rice, millets, fruits and vegetable crops were estimated. Fundamental studies like ecology and biology of important crop pests, efficacy of juvenile hormones and insect attractants were carried out. New methods like padding of insecticides, use of insect pheromones for population survey and control were conducted. The important findings obtained during the year in different projects are presented hereunder.

1. Crops

A. Cereals

(i) **Rice :** At Coimbatore application of granules of oftanol, mocap, ficam and hildan recorded lower leaf folder incidence of 2.02, 2.25, 3.44 and 3.70 per cent respectively as against 8.94 per cent in untreated control. These treatments were also effective and recorded less than 5 per cent white ear infestation. Treatments with mocap, oftanol, maximum protection treatment and solvirex recorded 5177, 5103, 4981 and 4787 kg of grain yield/ha as against 3582 kg/ha in control.

In another experiment with spray formulations, BPMC, MIPC, sumithion and hildan recorded lower white ear infestation of 8.61, 9.81, 10.13 and 10.17 per cent respectively as against 18.60 per cent in untreated control. These treatments recorded significantly higher yield than the control.

A seedling screening test was developed at Coimbatore to evaluate the resistance in rice accessions to the brown planthopper (BPH) of rice. Using this technique, 285 rice accessions were screened under controlled infestations and 85 accessions were rated as resistant/moderately resistant. From the tests conducted, it was observed that BPH collected from Pondicherry and Coimbatore are not different biotypes as revealed from their host/insect relationship. Crossing of two moderately resistant varieties, viz., ASD II and T 7 with six popular varieties was done and the F 1 seeds have been collected. Three species of rice root nematode, *Hirschamanniella gracilis, H. mucronata* and *H. oryzae,* were identified from Coimbatore, Trichy and Aduthurai. Two new species of the genera were recorded from Bhavanisagar and Kaveripattinam and are yet to be named. For the control of rice root nematode, dipping the bare roots of rice seedlings with chlorpyriphos or phosphamidon 0.02 per cent for 20 minutes effectively disinfected the rice seedlings and checked further build up of nematode population in the transplanted field for two months. These treatments had produced the highest yield of 3050 and 2937 kg/ha respectively as against 2200 kg/ha in the untreated control. The cost of treatment worked out to Rs. 25 and 50 for chlorpyriphos and phosphamidon respectively.

At Aduthurai, six varieties viz., W 13400, PTB 10, RPW 9-4-55-1, LUANG 152, RPW 6-17 and RP 8-9 were found to be resistant for gall midge. Spraying with BPMC at 200 ml/ac reduced the incidence of gallfly at Madurai.

Under the BPH screening and biotype studies at Aduthurai, it was found that the varieties ARC 6579, 14636, 14766-A, 71426 Manohar sali, Parakulaw and IET 6787 exhibited field tolerance to BPH, recording a low population of 3 as against 367 in the susceptible rice variety Jaya. Spraying of quinalphos 0.5 kg a.i./ha at 30, 45 and 60 days after transplanting resulted in resurgence of BPH compared to other insecticidal treatments and control.

At Madurai, spraying neem oil at 4 litres/ac was found to be effective in reducing the BPH population. Among the natural enemies of BPH, *Coccinella arcuata* was found to be very effective. The adults and fourth instar grubs could consume 28.4 to 30.3 hoppers per individual per day. The myrid bug *Cyrtorhinus lividipennis* was maximum during September to October. Maximum incidence of BPH was observed during the months of September to October in Pondicherry region. Maximum leaf folder incidence was noticed from December to January at Pondicherry, while at Madurai the incidence was maximum from September to October. Maximum incidence was at 96 days after sowing. Low rainfall and high humidity favoured the infestation of this pest Spraying of quinalphos 600 ml/ac controlled the leaf folder effectively at Madurai. Spraying of two rounds of dichlorvos at 250 ml/ha based on the economic threshold level was effective at Pondicherry.

Under the rodent control project, the rat damage was found to be severe at milky stage as well as at harvest in summer paddy. Transplanting of rice

crop during September was susceptible for rat damage. The population density of rats per acre was found as 8 females, 7 males and 11 young ones. Maximum kill of rats was obtained when phorate granules were applied at 15 g per burrow. Introduction of carbon monoxide gas from the exhaust of the power sprayer into the burrow was also found to effect 40.5 to 60 per cent mortality of rats in about 15 minutes.

(ii) **Sorghum :** At Coimbatore soil application of carbofuran 3 G at 3 g/metre row was observed to be the best for the control of sorghum shoot fly (4.93 per cent infestation), followed by seed soaking in carbofuran 40 W/WF treatment at 50 g a.i./ac which recorded 16.30 per cent infestation while the untreated control recorded 53.95 per cent. Seed pelleting with chlorpyriphos was the cheapest, costing Rs. 2 per acre.

In the control of sorghum stem borer, spraying fenvalerate (Sumicidin) at 0.01 per cent or decamethrin (Decis) at 0.001 per cent was very effective recording 4.90 and 4.67 per cent infestation respectively as against 12.23 percent in untreated control. Decamethrin recorded the highest yield of 3870 kg/ha followed by permithrin with 3786 kg as against 2049 kg in untreated control.

Among the pre-release varieties, Co. 23 and USV 21 recorded minimum shootfly infestation of 10.7 and 11.0 per cent, while CSH 5 recorded 34.0 percent. Among the multiple resistant varieties, MR 99 (2), MR 120 A, MR 131 A and MR 11 AC recorded less than 5 per cent infestation.

(iii) **Ragi :** For controlling the ragi rusty plum aphid, *Hysteroneura setariae*, two rounds of spraying of malathion 0.05 per cent or phosalone 0.07 per cent or chlorpyriphos 0.04 per cent or dimethoate 0.07 per cent once at 35 days after transplanting and the second round at earhead stage were effective and produced 90 per cent mortality of the aphids. These treatments also gave significantly higher yields of 3867, 3847, 3557 and 3540 kg respectively while the untreated control recorded 1903 kg/ha. The net profits obtained due to plant protection were Rs. 1736, 1687, 1240 and 987/ha by the treatments of malathion, phosalone, chlorpyriphos and dimethoate, respectively. The residues of the above insecticides present in the ragi grains were below the tolerance level.

B. **Pulses**

(i) **Bengalgram :** In the control of pod borers, spraying of endosulfan 0.07 per cent at flowering recorded the lowest bod borer infestation (10.92 per cent), followed by fenvalerate 0.01 per cent (14.69 per cent) and neem seed kernel extract (16.40 per cent), at Coimbatore. These three treatments were on par and recorded a mean yield of 1119, 1246 and 1046 kg/ha respectively. The cost of treatment per hectare was Rs. 75 for endosulfan and Rs. 3 for neem seed extract.

In the experiment with dust formulations, endosulfan 4 per cent dust recorded minimum pod borer infestation (14.95 per cent), followed by volatin and phosalone dust. However, malathion 5 per cent dust recorded the highest yield of 820 kg/ha. The cost of treatment per hectare worked out to Rs. 83, 106 and 199 for malathion, endosulfan and phosalone, respectively.

Seventy four entries were screened for resistance to major pests of bengalgram. The variety ICCC 6 recorded 'nil' incidence of pod borer.

(ii) **Cowpea :** Aldicarb and disyston at 1, 2 and 3 ppm levels inhibited nitrate formation in soil. Carbofuran and phorate enhanced microbial population in the rhizosphere of cowpea and degraded quickly in rhizosphere region than in the non-rhizosphere region.

(iii) **Blackgram :** Fifty four accessions were screened for their resistance to pod borer and stemfly infestation at Coimbatore under unprotected conditions. The accession Pant U. 19 was resistant to the most susceptible variety.

Among the 75 lines of blackgram screened at Vamban for their resistance to pests, 3 types viz., Pusa 1. PLS 1, H-76-a, were found to be least susceptible to both galerucid beetle and pod borer.

At Madurai, there was no reduction of the toxicity of activated clay to the stored grain pests of pulses like *Callosobruchus chinensis*, *Tribolium castaneum* and *Sitophilus oryzae*, when the sulphuric acid used in the activation process was recycled and by substituting muffle furnace heating with pan heating and centrifugation with sedimentation mechanism

(iv) **Greengram :** Forty two entries were screened for pod borer resistance. LGG 122, 10/303, Co. 3, ML 5, ML 12, PIMS 4 and V 4718 recorded 'nil' incidence at Coimbatore. At Vamban, dusting of endosulfan 4 per cent or phosalone 4 per cent at 25 kg/ha on 25th day of sowing minimised the incidence.

(v) **Redgram :** Spraying two rounds of either monocrotophos, endosulfan or chlorpyriphos at 0.04 per cent, one at the time of 50 per cent flowering and another at pod formation stage, proved to be effective in reducing the pod borer incidence in redgram at Vamban. Among the dust formulations, dusting of folidol 2 per cent or folithion 5 per cent, endosulfan 4 per cent at 25 kg/ha, one at 50 per cent flowering and the other at pod formation stage, controlled pod borer infestation and increased the yields.

(vi) **Horsegram :** Dusting of endosulfan 4 per cent, folithion 5 percent or phosalone 4 per cent at the rate of 25 kg/ha at 50 per cent flowering stage proved to be effective in reducing the pod borer incidence at Vamban.

C. **Oil Seeds**

(i) **Groundnut :** Spraying either fenvalerate 0.01 per cent or cypermethrin 0.01 per cent, chlorpyriphos 0.05 per cent or methomyl 0.04 per cent or monocrotophos 0.04 per cent controlled the late instar larvae of red hairy caterpillar *Amsecta albistriga* resulting in more than 96 per cent mortality at Coimbatore. By spraying diflubenzuron (Dimilin) at 50 ppm, 93 per cent mortality was noticed on the red hairy caterpillar.

Application of two rounds of cypermethrin and permethrin at 25 g a.i./ac, once when the leaf miner was noticed in the leaf and the other one a month later, gave 97.6 per cent control at Madurai.

(ii) **Gingelly :** At Coimbatore, spraying of monocrotophos 0.04 per cent on 20th and 40th day after sowing reduced the incidence of phyllody disease significantly. Fenthion and monocrotophos recorded 0.47 and 0.85 ppm of residues in the gingelly seeds.

(iii) **Coconut :** At Vaniyambadi, trunk injection of nuvacron at 1.25, 1.67, 2.5 and 5 ml of the whole insecticide as such or after dilution to 20 ml by adding water, effected equal degree of kill of *Nephantis* larvae ranging from 80 to 85 per cent. The insect moulting inhibitor, diflubenzuron applied at the rate of 2.5 to 20 g/tree was effective in preventing moulting of larvae and also induced various kinds of deformities on the larvae.

D. **Fibre Crops**

Cotton : For the control of cotton bollworms at Coimbatore, application of synthetic pyrethroids at 15 days interval commencing from 45th day of sowing reduced the bollworm infestation in shed meterial, in mature bolls, on boll, locule and bad kapas basis and increased the yield of seed cotton.

Cotton crop protected with different synthetic pyrethroids recorded 9.8 to 33.2 per cent bollworm infestation as compared to 35.0 per cent in the crop treated with monocrotophos alternated with fenvalerate. In monocrotophos treated plots and untreated control plots, the infestation was 6?.8 and 49.8 per cent respectively. Locule damage and bad kapas content were also low in pyrethroids treated plots. The yield of seed cotton ranged from 1254 to 1753 kg/ha in pyrethroid treated plots, while it was 880 kg/ha in untreated check plot. In the late stages of crop growth, after the completion of 5 rounds of sprayings with pyrethroids, severe mite infestation and aphid incidence were recorded, whereas the plots treated with monocrotophos alternated with fenvalerate were free of aphid infestation and mite damage.

Carbofuran granules applied at 1 kg a.i./ha at 30 and 60 days after sowing effectively controlled the cotton ash weevil. Carbofuran treated plot recorded 2.1 per cent infestation by ash weevil, while the untreated check plot registered 49.9 per cent infestation.

At Madurai, soil drenching with BHC 50 per cent WP at 0.1 per cent applied four times at 15 days interval commencing from 15 days after sowing reduced the infestation of cotton stem weevil by 69.6 per cent.

At Coimbatore, under laboratory conditions, the parasitisation by egg parasite *Trichogramma australicum* on *Earias* eggs was to an extent of 88 per cent while the pupal parasite *Trichosphilus pupivora* parasitised the *Earias* egg to an extent of 11.5 per cent. Studies were conducted with egg-larval parasite *Chelonus blackburnii* on cotton bollworms. The parasites were released in the field against *Earias vitella* and the parasitisation under field conditions ranged from 6 to 7.2 per cent.

Combination sprays of monocrotophos 0.05 per cent and phosalone 0.1 per cent with zinc sulphate 1 per cent and urea 1 per cent did not have any phytotoxic effect on cotton.

E. **Vegetables**

(i) **Bhendi :** Application of aldicarb granules at 0.5 kg a.i./ha 15 days after sowing controlled all the sucking pests at Coimbatore. Spraying of fenvalerate 0.005 per cent or permethrin 0.01 per cent commencing from 40 days after sowing and repeated at 10 days interval controlled the fruit borer of bhendi. The incidence of fruit borer was 4.8 and 5.6 per cent in the two treatments respectively while it was 22.3 per cent in untreated control. The yield was 10.6 and 10.0 tonnes/ha in fenvalerate and permethrin treatments respectively, while in control it was 1.9 tonnes/ha.

Seed treatment of bhendi with aldoxycarb 3 per cent a i. + carbendazim 0.2 a.i. or carbofuran 3 per cent a.i. + captafol 0.25 per cent significantly reduced wilt complex due to *Rotylenchulus reniformis* and *Rhizoctonia bataticola*. At 85 days after sowing, the incidence of wilt was 0.21 per cent and 4.29 per cent respectively in these treatments as against 20.6 per cent in the control.

(ii) **Brinjal :** Spraying of dimethoate 0.03 per cent 21 days after planting, followed by four syrayings with synthetic pyrethroids like decamethrin, cypermethrin, fenvalerate and permethrin at 0.005 per cent at 15 days interval commencing from 5 days after planting, controlled the brinjal fruit borer. Decamethrin 0.005 per cent recorded the least frutit borer incidence of 3.88 per cent as against 46,3 per cent in control. Decamethrin 0.005 per cent spray recorded the highest yield of 19.4 tonnes/ha, followed by cypermethrin with 18.9 tonnes, while the untreated control yielded only 5.3 tonnes.

(iii) **Chillies :** At Coimbatore, for the control of green peach aphid *Myzus persicae* on chillies. spraying with methomyl at 440 g/ac was very effective recording 100 per cent mortality of aphids, 72 hours after treatment.

Spraying of tamaran, monitor, orthene or a combination of fenthion 0.1 per cent + methyl demeton 0.025 per cent or heptachlor 0.04 per cent + methyl demeton 0.025 per cent was very effective in controlling the green peach aphid population for two weeks. at Madurai.

Application of carbofuran granules at 0.3 g. a. i./m^2 or metham sodium at 20 ml/m^2 controlled the root knot nematode *Meloidogyne incognita* and ensured increased weight of seedlings. The gall index in these two treatments was significantly lower than in the untreated control. Among the different processing treatments. cooking of vegetables reduced the initial residues upto 80 per cent, hot water treatment to the extent of 40 to 60 per cent and cold water treatment upto 30 to 40 per cent.

F. Tuber crops

(i) **Potato :** The crop which received a basal application of aldicarb at 2.5 kg a. i./ha did not contain any detectable residues in the tubers at harvest.

(ii) **Sweet potato :** The crop that received aldicarb at 1 kg a.i./ha for pest control did not have any toxic residues in the tubers at harvest. Foliar application of methyl demeton recorded 0.14 ppm residues in the tubers and was safer to use.

G. Fruit crops

(i) **Mango :** Mangonut weevil *Sternochaetus mangiferae* was controlled effectively by spraying carbaryl 0.20 per cent and fenvalerate 0.20 per cent. These treatments recorded 'nil' infestation as against 47.2 per cent in control. The cost of treatment with carbaryl 0.02 per cent worked out to Rs. 200/spray/ha of garden. Application of phosphamidon, dimethoate, fenitrothion, methyl parathion, fenthion, carbaryl and quinalphos twice to mango recorded 0.58, 0.74, 0.56, 0.07, 0.26, 0.40 and 0.48 ppm of residues respectively in the fruits harvested 50 days after the second spray. At these residue levels the fruits were safer to consume. There were no detectable residues of anthio, bendiocarb and FMC 35001.

Padding method of application of monocrotophos or dimethoate controlled the mango stemborer. In this method, 5 cm^2 bark was removed from the basal portion of the trunk infested by mango stemborer. On the exposed portion, a thin layer of absorbent cotton was placed and 10-15 ml of either monocrotophos or dimethoate was poured slowly and closed by the same bark piece over which mud was plastered.

(ii) **Acid lime and mandarin orange :** At Periakulam application of aldicarb or carbofuran granules at 4 kg a.i./ha was found to be effective in controlling the citrus nematodes upto ten months with no build up of population till four months. In acid lime, application of methyl demeton 0.05 per cent and chlorpyriphos 0.05 per cent were found to be effective for the control of leaf miner and leaf caterpillar, respectively. Acid lime trees infested with high incidence of leaf miner were found to be heavily infested by the citrus canker.

H. Other Crops

(i) **Turmeric :** Preplanting dip of rhizomes in phosalone 0.07 per cent, methyl parathion 0.05 per cent or methyl demeton 0.05 per cent solution controlled the rhizome scales effectively. Spraying with dimethoate 0.06 per cent or fenitrothion 0.02 per cent controlled the thrips, *Panchaetothrips indicus*.

(ii) **Betelvine :** In the experiment for the control of betelvine scale *Lepidosaphes cornutus*, spraying of chlorpyriphos effected the highest mortality of 75.48 and 81.4 per cent during 5 and 11 days after spraying. The pesticide residue at the time of harvest was below the tolerance level.

Harvested betelvine leaves one week after spraying of methyl demeton 0.025 per cent, dimethoate 0.03 per cent, phosphamidon 0.04 per cent monocrotophos 0.02 per cent and FMC 35001 0.02 per cent contained high amounts of toxic insecticide residues. However, insecticides dissipated to safer levels when the leaves were harvested 30 days after the spray.

(iii) **Tobacco :** Spraying fenitrothion 0.25 per cent a.i./ha controlled the green peach aphid *Myzus persicae* on tobacco. It recorded 94.2 per cent mortality of aphids in 3 days and the cost of treatment worked out to Rs. 70/ha.

(iv) **Patchouli :** Application of carbofuran or phorate or aldicarb at 2 kg a.i./ha at the time of planting rooted cuttings reduced population of the parasitic nematodes, *Scutellonema* sp., *Helicotylenchus* sp. and *Tylenchorhynchus* sp., significantly. The residues of these three chemicals in leaves were at non-detectable level four months later.

2. Insect pathogens

A. Virus

In a field experiment with bengalgram, when the nuclear polyhedrosis virus was applied at 250 larval equivalent (LE)/ha during evening hours, thrice at weekly intervals, the population of early instars of *Heliothis armigera* was significantly reduced. The yield was also found to be

more in the case of virus treated plot at 250 LE/ha. In another field experiment, when the virus was applied at 250 LE/ha with and without an adjuvant, the yield was significantly more in virus adjuvant treatment compared to virus alone and endosulfan spray.

In the safety tests with poultry birds and fishes, no consistent deleterious effects due to oral feeding of the virus were observed with white rats.

B. **Protozoa**

The pathogenicity of the neogregarine *Farinocystis tribolii* weiser, a sporozoa to different stages of *Tribolium castaneum* (Herbst) infesting stored grains, was studied. *F. tribolii* was found to occur commonly in *T. castaneum* populations breeding on wheat flour, maida, rice, wheat grain, broken sorghum and pearl millet.

The infection by *F. tribolii* resulted in the breakdown and depletion of the fat body of *T. castaneum*. The larval period was markedly prolonged in third, fourth and fifth instars due to the infection. *F. tribolii* infection inhibited moulting in larvae. The infection interfered with the metamorphosis of the host insect resulting in abnormal forms. All the larval instars were equally susceptible and adults were least susceptible. Between the sexes, females were more susceptible. The different host foods of *T. castaneum* had no effect on the infectivity of the protozoan.

The *F. tribolii* infected cadavers, when introduced into wheat flour, effectively checked the population development of *T. castaneum*. Though purified spores of *F. tribolii* also could control *T. castaneum*, population in wheat flour cadaver treatments were more effective. The *F. tribolii* infection reduced the LD_{50} of malathion to *T. castaneum*.

Studies with the chitin inhibitor diflubenzuron on *Spodoptera litura* revealed that the hatchability of the eggs was reduced to an extent of 84.3 per cent when the eggs of *S.litura* were dipped in diflubenzuron solution. From the treated eggs, the larvae were unable to come out of egg shell due to lack of chitin deposition in the developing embryo's cuticle. Mortality of the larvae occurred during the early larval stage and they were unable to shed their old cuticle. Pupal deformities and pre-pupal mortality resulted in the late stages of the larvae. Diflubenzuron treatment caused 100 per cent reduction in the pupation and malformed pupae were formed showing larval-pupal mosaics and various degrees of morphological deformities. Adult emergence was affected and even if the adults emerged they were malformed with crippled wings and died within 48 hours. Histological studies of cuticle showed that diflubenzuron treatment affected the endo-cuticular development.

Seventeen new species of Eriophyid mites were collected from different plants, processed and were described.

Under the surveillance scheme for pests and diseases, Coimbatore district was surveyed regularly for the occurrence of pests and diseases on paddy, cotton and groundnut. The BPH population and leaf folder damage were observed upto 35 per cent during September at Gobi and Bhavanisagar. The gall fly damage was more during November-December months at Avinashi, Gobi and Anthiyur. Bacterial leaf blight of paddy was severe during May at Coimbatore (48 per cent) and in September-October at Aliyarnagar (31 per cent)

In cotton, the stem weevil damage was severe at Palladam, Sulur, Nambiyur, Avinashi, Bhavanisagar and Dharapuram. The early occurrence of black arm disease was noticed at Palladam during October.

Occurrence of red hairy caterpillar and *surulpoochi* in groundnut during the early season was recorded at Annur, Puliampatty, Sathi and Kunnathur during November-December. The *surulpoochi* infestation was more at Dharapuram and Udumalpet taluks during February-March. Tikka disease was maximum with 30-43 per cent at Arasur, Erode, Bhavanisagar, Aliyarnagar, Nambiyur during July-September while the rust diseases were severe at Avinashi and Aliyarnagar during July-August with 21-23 per cent.

3. **Other findings**

Juvenile hormone and antifeedant activities were identified in *Parthenium hysterophorus*. The leaves of young plants showed high feeding deterrent activity. When tested against *Spodoptera litura* larva, the extract of young leaves showed leaf protection to the extent of 54.3 per cent. The extract prevented the normal development of larvae. It also induced starvation in the larvae as reflected in the reduced feeding and reduced weight. When the extract was applied on the sixth instar larvae of *S. litura*, the larvae showed distinct growth disturbance resulting in larval-pupal intermediaries.

Experiments were conducted with sticky traps baited with synthetic gossyplure, which could attract the males of cotton pink bollworm moths alone for two seasons in the late stages of crop growth in cotton field. The efficacy of seven different concentrations of one of the isomers (Z, Z-isomer) in 1:1 mixture of two isomers viz., Z,Z, and Z, E isomers in attracting the moths was studied. It was found that population of male moths attracted was high in 50 per cent concentration of Z, Z, isomer. The numbers trapped per trap were 68 and 57 respectively. It was calculated that with 20 traps in one hectare, 1360 male moths could be collected. Thus it is evident that synthetic gossyplure may be successfully used to attract the male pink bollworm moths for population assessment.

PLANT PATHOLOGY

Crop losses caused by diseases continue to be very high and this department made intensive efforts to find out methods to reduce such losses. Disease resistant varieties or sources of disease resistance have been identified in some of the important crops. Some of the diseases could be effectively checked by adopting suitable agronomic practices alone. Some of the soil-borne and air-borne diseases could be controlled using suitable systemic chemicals for seed treatment and foliar application. Methods have been evolved to eradicate pathogens present in the seeds and also to control storage fungi causing considerable damage to seeds. Suitable fungicides have also been identified to control major diseases of various crops. The achievements of this department are given in detail below :

1. Cereals

(i) **Rice :** Tungro, a virus disease, appeared in many parts of Tamil Nadu during the year. Intensive search was made to locate varieties resistant for the disease. One culture, IET 6268 showed field resistance at Coimbatore as well as at Hyderabad, Cuttack and Chiplima (Assam).

Seventy four rice cultures showed field resistance to the brown spot disease caused by *Helminthosporium oryzae*. Efficacy of various fungicides in the control of the disease was assessed. The highly susceptible variety, Benibhog was used. The fungicides were sprayed twice, at 20 and 40 days after planting. Hinosan and dithane M-45 were highly effective in controlling the disease (Table 25).

TABLE 25. Efficacy of fungicides in the control of brown spot disease of rice

Treatment	Percentage disease intensity	Yield (kg/ha)
Hinosan (500 ml/ha)	13.2	653
Dithane M-45 (1 kg/ha)	15.4	595
Panolil (500 ml/ha)	18.3	568
Aureofungin 25 ppm + copper sulphate 500 ppm	22.0	572
Control	53.0	475

Sheath rot (*Acrocylindrium oryzae*) is another major problem in our state. Various chemicals were screened for their efficacy in controlling the disease. The variety 'Kannagi' was grown and the fungicides were sprayed at 45 and 65 days after planting. Bavistin, hinosan, dithane M-45 and panolil were effective in controlling the disease (Table 26).

TABLE 26. Efficacy of fungicides in the control of sheath rot of rice

Treatment	Disease intensity in category value	Yield (Kg/ha)
Bavistin (500 g/ha)	0.6	2037
Hinosan (500 ml/ha)	0.9	1983
Dithane M-45 (1 kg/ha)	1.1	1869
Panolil (500 ml/ha)	1.3	1719
Syllit (1 kg/ha)	2.5	1593
Control	4.6	1503
C.D. (P=0.05%)	0.7	344

One rice culture, IET 6670, was highly resistant to bacterial leaf blight of rice. Fifty one other cultures showed field resistance.

(ii) **Sorghum :** Downy mildew pathogen is transmitted through seed, soil and air. New systemic fungicides ridomil 25 W.P. and apron 35 S.D. were effective in the control of the pathogen. A trial was conducted to assess the efficacy of these fungicides in the control of the disease. The results suggested that mere seed treatment with the fungicides was not much effective. But seed treatment followed by foliar application of ridomil was highly effective in controlling the disease (Table 27).

TABLE 27. Efficacy of systemic fungicides in the control of sorghum downy mildew

Treatment	Percentage disease incidence (Transformed values)
Seed treatment with apron at 2 85 g/kg of seed	56.5
Seed treatment with apron at 5.7 g/kg of seed	49.1
Seed treatment with ridomil at 4 g/kg of seed	45.1
Seed treatment with ridomil at 8 g/kg of seed	42.5
Seed treatment with ridomil at 4 g/kg + one foliar spray with 0.4% ridomil	29.9
Seed treatment with ridomil at 8 g/ha + one foliar spray with 0.8% ridomil	29.8
Foliar spray with 0.4% ridomil alone	37.9
Foliar spray with 0.8% ridomil alone	36.2
Control	63.8
C.D. (P=0.05%)	8.0

Head moulds and head rot have become major diseases in sorghum. *Fusarium moniliforme* is one of the important fungi causing these diseases. It affects growth rate of the plants and causes twisted top also. This pathogen was found to be internally seed-borne. Attempts were made to eliminate this pathogen from seed. A seed lot, Co.23, had more than 50 per cent infection

with the pathogen. The results presented in Table 28 showed that seed treatment with bavistin (2 g/kg of seed) decreased the twisted top incidence and increased the growth rate of plants. This treatment resulted in greater straw and grain yield.

TABLE 28. Effect of seed treatment for control of *F. moniliforme* infection in seed on growth and yield of Co. 23 sorghum

Treatments	*F. moniliforme* infection in seed (%)	Twisted top indidence (%)	Mean height of the plant (cm)	Mean straw yield (kg/plot)	Mean grain yield (g/plant)
Bavistin	0	6.1	145	12.3	25.5
Benlate T	0	10.5	141	10.0	11.5
Vitavax C	5	19.0	135	9.3	9.1
Bayton	16	13.4	132	11.3	17.7
Thiram	15	15.5	130	7.3	11.2
Control	54	47.3	113	5.7	6.6
C.D. (P = 0.05%)	—	—	15	3.3	8.5

Four sorghum germplasm entries, Spv. 126, MR. 12, M. 66191 and M. 66212, were moderately resistant to head moulds.

(iii) **Cumbu:** Many genotypes viz. IP 18, 44,.230. 264, 330, 394, 4 3, 430, 452, 562, 830, 881, 1055, 1110, PT 813/3, 818/10. 837/3, 1518, 1532, 1577, 1670, 1726, 1751, 1824, MS 5646A, 5711A, 5054A and 126 D_2A were found to be resistant to downy mildew consistently for the past four years.

When cumbu seedlings were transplanted in the field, the downy mildew incidence was less when compared to direct sowing (Table 29).

TABLE 29. Effect of transplanting on downy mildew of cumbu

Name of varieties	Downy mildew incidence (%)	
	Direct sowing	Transplanting
23 D_2B (Susceptible)	100.0	44.0
MS 7373 (Moderately resistant)	17.8	11.4

Seed treatment with ridomil (8 g/kg of seed) followed by one spray of 0.1 per cent ridomil at 20 days after planting controls the downy mildew effectively (Table 30).

TABLE 30. Fungicidal control of downy mildew of cumbu (var. 23 D_2B)

Treatments	Downy mildew (%)	Yield (Kg/ha)
Seed treatment with ridomil at 8 g/kg of seed	54.0	216.7
Seed treatment with ridomil + one spraying with ridomil 0.1%	5.5	461.7
Seed treatment with demosan at 8 g/kg of seed	97.9	36.4
Seed treatment with demosan + one spraying with demosan 0.1%	96.9	52.2
Seed treatment with bafin at 8 g/kg	98.0	18.3
Seed treatment with bafin + one spraying with 0.1% bafin	96.8	51.7
Untreated check	98.9	36.7
C.D (P = 0.05%)	11.3	24.9

(iv) **Minor Millets** : Of 470 tenai types tested, Sl. 76/4 showed resistance to rust disease for the past 3 years. This type has been released as Co. 5 variety during this year. Smut disease of varagu appeared in a severe form and intensive search was made to identify resistant type. RPS 123 and HPS 147 were free from the disease (Table 31).

TABLE 31. Reaction of varagu varieties to smut disease

Varieties	Smut incidence (%)
RPS 123	0
HPS 147	0
Co. 3	12.9
Co. 2	45 2

Kudiravali is also affected by smut disease and PC 49 showed low percentage of infection (Table 32) during the past two seasons and it was released as Co. 1 in this year.

TABLE 32. Reaction of kudiravali varieties to smut disease

Varieties	Smutted earheads (%)
PC. 49	1.2
K. 932	2.7
VL. 7	4.6
RAU. 3	38.6

2. Pulses

Root rot *(Macrophomina phaseolina)* and various virus diseases like mosaic, yellow mosaic and leaf crinkle are the common factors which reduce the yield of blackgram, greengram, cowpea and lablab. Intensive attempts were made to detect genotypes with resistance to all these diseases. Blackgram types like UG-117, 153, 170, B. 76, B. 12-4-4, H. 76-1, JLU-5/1, Plant-u-30, Selection 1, K-78, Co. 1 x Co. 2-4, Co. 1 x Co. 2-3, BNu 1-5 and ADT-2 showed field resistance to root rot and less susceptibility to yellow mosaic and leaf crinkle. Greengram entries like KM 2. PIMS 1, and PIMS 3 were found to be moderately resistant to root rot, tip blight, yellow mosaic, crinkle, mosaic and ring spot.

Cowpea varieties like E.C.455, Lolita, Co.2, PLS-1, PLS-31 and MS 902/1 were found to be moderately resistant to green mosaic, yellow mosaic and ring mosaic.

Ten bengalgram types viz. ICCC-4, 10, 18, 19, H. 76-105, Phule 5-1, GG-588, GNG-88, HMS-6 and HMS-23 were resistant to root rot. Lablab varieties Mutant-3, DL. 103/3 and DL. 104/1 were resistant to root rot, die-back, yellow mosaic and ringspot virus diseases. A local horsegram collection Alagapuri was resistant to root rot.

3. Oilseeds

(i) **Groundnut:** The yield of groundnut is mainly restricted by diseases. Tikka leaf spot, rust and ring mosaic diseases continued to be the major diseases. The results of the field trial conducted during this year revealed that bavistin 0.05% + dithane M-45 0.1 per cent effectively controlled tikka leaf spot while baycor 0.2 per cent and daconil 0.2 per cent were highly effective in controlling rust disease. Baycor 0 2 per cent or daconil 0.2 per cent as well as 0.1 per cent or bavistin 0.5 per cent + dithane M-45 0.1 per cent significantly increased the yield (Table 33).

TABLE 33. Effect of fungicides on the control of tikka and rust diseases

Treatments	Mean disease index for tikka	Mean disease index for rust	Mean yield (kg/ha)	Per cent increase over control
Copper oxychloride (0.3%)	87.0	49.0	1,770	43.3
Dithane M-45 (0.2%)	70.0	49 8	1,805	46.2
Sulphur (10 kg/ha)	93.8	34.5	1,620	31.2
Daconil (0.1%)	73.3	44.5	2,033	64.6
Daconil (0.2%)	51.3	26.0	2,158	74.7
Baycor (0.2%)	46.3	18.0	2,403	94.6
Bavistin (0.05%) + dithane M-45 (0.1%)	27.5	60.0	1,943	57.3
Control	94.5	35.8	1,235	—
C.D. (P = 0.05)	8.0	9.5	514	

An antiviral principle (AVP) was extracted by boiling dried sorghum leaf powder in water for 1 hour. The supernatant was filtered and adjusted to 1:10 (for one kg of leaf samples taken, the extract was adjusted to 10 litres with water). The extract was sprayed at 500 litres per ha at 10 and 20 days after sowing. It was highly effective in inhibiting the infection of groundnut ring mosaic virus. Spraying of ths principle on groundnut reduced the ring mosaic disease incidence (Table 34).

TABLE 34. Effects of antiviral principle from jowar (JAVP) and insecticides on groundnut ring mosaic disease incidence.

Treatments	Mean disease incidence (%)	Mean yield (kg/ha)	Per cent increase over control
JAVP	9.85*	1,212	54.4
Nuvacron	8.35	1,312	67.1
Orthene	9.78	1,062	35.3
JAVP sprayed on 10th and 20th day of sowing + nuvacron sprayed on 30th day	8.05	1,250	59.2
JAVP sprayed on 10th and 20th day of sowing + orthene sprayed on 30th day	8.83	1,019	29.8
Control	16.48	785	—

C.D.(P=0.05) = 1.38

* Transformed values

(ii) **Gingelly** : Two field experiments were conducted for the control of powdery mildew and *Alternaria* blight of gingelly. The mean disease incidence and plot yield are given in Table 35.

TABLE 35. Incidence of foliar diseases and yield of gingelly in fungicidal trial

Treatments	Powdery mildew (Disease index)	*Alternaria* blight (Disease index)	Yield (g/plot)
Dithane M-45 (40 days)	15.5	2.8	209
Dithane M-45 + wettable sulphur (40 days)	9.3	3.6	221
Dithane M-45 (40 days) + wettable sulphur (60 days)	16.5	3.4	232
Wettable sulphur (40 days)	11.2	4.0	225
Bavistin (40 days)	12.2	3.8	222
Agrimycin + fytolan (40 days)	14.4	2.9	254
Control	17.1	4.3	181

One spray with 0.2 per cent dithane M-45 + 0.4 per cent wettable sulphur at 40 days after sowing controlled both the diseases and gave 22 per cent increase in yield over control.

The incidence of charcoal root rot in the monsoon crop was high. In this season, the plots receiving seed treatment with thiram recorded the lowest incidence of 0.5 per cent as against 16.7 per cent in control (Table 36).

TABLE 36. Efficacy of seed treatment in controlling charcoal root rot of gingelly.

Treatment	Per cent infection	Yield (g/plot)
MBC	4.0	217
Plantvax	3.8	308
Vitavax	4.5	203
Bavistin	2.2	217
Brassicol	3.5	269
Captan	3.7	293
Daconil	2.7	249
Difolatan	4.8	194
Dithane M-45	3.3	247
Thiram	0.5	298
Bavistin slurry	6.7	239
Control	16.7	211

Gingelly phyllody is another serious disease. Four gingelly cultures viz. Punjab til.1, MT-67-8, Phule til.1 and 5031 showed low percentages of infection

(iii) **Coconut** : At Veppankulam, application of farmyard manure (200 kg/tree/year) or tank silt (300 kg/tree) or neem cake (5 kg/tree) alone or in combination with soil drenching with bordeaux mixture, reduced the incidence of Thanjavur wilt disease considerably. Among these, neem cake treatment gave the lowest disease intensity (D.I : 4.64 per cent; Control : 63.12 per cent).

4. Vegetables

Chilli ; Powdery mildew, *Cercospora* leaf spot and die-back diseases cause heavy losses in chilli. A field trial was conducted to find out suitable fungicide to control all the diseases. Bayleton and fytolan were highly effective in controlling powdery mildew while all the fungicides tested were effective against die-back and *Cercospora* leaf spot (Table 37).

TABLE 37. Efficacy of different fungicides in the control of diseases of chilli (Transformed values)

Treatment	Per cent disease incidence		
	Powdery mildew	Die-back	*Cercospora* leaf spot
Sulfavit 0.2%	27.57	21.83	36.25
Fytolan 0.25%	25.87	17.61	30.60
Dithane M-45 0.2%	31.17	19.18	25.69
Dithane Z-78 0.2%	40.38	20.75	25.76
Benlate 0.1%	41.01	17.03	15.90
Bayleton 0.1%	8.10	23.10	25.96
Difolatan 0.2%	33.58	18.57	27.94
Control	61.20	31.68	47.00
C.D.(P=0.05)	19.41	6.08	12.56

5. Flowers

(i) **Jasmine :** Dithane M-45 (0.2 per cent) was highly effective in controlling leaf spot diseases of jasmine. A trial was laid out to find out the number of sprays required to effectively control the disease. The spraying was done from May and repeated once in a month. Number of sprays tried were 3, 4, 5, 6, 7 and 8. The data (Table 38) showed that a minimum of five sprays from May to September was required for effective control of the disease.

TABLE 38. Effective schedule of spraying dithane M-45 in the control of leaf spot diseases of jasmine

Dithane M-45 sprays	Per cent leaf spot infection (Trans formed values)	Mean plot yield (kg)
3 sprays (May-July)	53.3	6.96
4 sprays (May-August)	52.5	7.53
5 sprays (May-September)	37.4	7.78
6 sprays (May-October)	30.6	7.51
7 sprays (May-November)	29.9	7.37
8 sprays (May-December)	26.5	7 93
Control	57.4	6.52
C.D.(P=0.05)	9.9	0.65

(ii) **Rose** : Bavistin 0.1 per cent was highly effective in the control of powdery mildew of rose. A trial was conducted to assess the number of bavistin sprays required to control the disease effectively. The sprays were given at monthly intervals commencing from May. The results presented in Table 39 showed that a minimum of five sprays was required to control the disease effectively.

TABLE 39. Effective schedule of fungicidal spray in the control of powdery mildew of rose

Bavistin spray	Per cent powdery mildew infection (Transformed values)	Number of rose flowers/ plot
3 sprays (May-July)	38.1	344
4 sprays (May-August)	36.1	485
5 sprays (May-September)	26.8	734
6 sprays (May-October)	26.2	763
7 sprays (May-November)	25.5	665
8 sprays (May-December)	22.6	686
Control	39.4	243
C.D. (P=0.05)	2.5	56

6. Fruits

Acid lime : From the cross protection experiment at Periyakulam on acid lime, it was found that the plants inoculated with a mild strain of citrus tristeza virus (CTV), besides maintaining the growth and vigour, was found to afford protection against infection by very severe strain of CTV. Pre-immunised acid lime plants were also observed to show low leaf canker when compared to uninoculated control.

Application of three rounds of either streptomycin sulphate (500 ppm) or fycop 40 A (0.2 per cent) or fytolan (0.2 per cent) at fortnightly intervals commencing after noting the initial infection was found to be effective for the control of canker in acid lime. Among the three chemicals, fytolan was most economical besides being effective.

Spraying with fytolan 0.3 per cent after pruning the dried twigs was effective for the control of twig blight, *Colletotrichum gloeosporoides*, on acid lime.

FACULTY OF HORTICULTURE

The Faculty of Horticulture was formed in February, 1979 with fonr separate Departments, viz., Pomology, Olericulture, Spices and Plantation Crops and Floriculture. Subsequently, the Departments of Food Technology and Forestry were also brought under the control of the Faculty of Horticulture. The research work at the University research stations, viz., Horticultural Research Stations at Periakulam, Kodaikanal, Thadiankudisai and Yercaud. Forestry Research Station at Mettupalayam and Cashew Research Station, Vridhachalam were also brought under the purview of the Faculty of Horticulture during the year under report, for effective coordination and supervision. At Coimbatore, research work was carried on in banana, papaya, grapes, guava, pomegranate, ber and other minor fruits (under Department of Pomology), in tomato, bhendi, brinjal, tubercrops, onion, chillies, leafy vegetables, cucurbits. etc., (under Department of Olericulture), in turmeric, coriander, fenugreek, fennal, arecanut, oilpalm, cocoa, pepper etc., (under Department of Spices and Plantation Crops) and in jasmine, rose, chrysanthemum, tuberose and other ornamental plants (under Department of Floriculture). The Department of Food Technology was engaged in work on processing of fruits and vegetables, on mushrooms and mycotoxins. Research work on bamboos and *Eucalyptus* was being attended to in the Department of Forestry. The Horticultural Research Station at Kodaikanal was engaged in work on medicinal and aromatic plants and temperate fruits and vegetables. At Yercaud, the work was mainly on semi-arid zone fruits such as pomegranate, jack, jaman and fig and also on mandarin orange, cardamum and other spice crops. Work on coffee and patchouli has also been started at this centre The Horticultural Research Station at Thadiyankudisai was attending to problems connected with bunchy top virus disease of hill bananas besides work on spice crops like cardamom, pepper, clove, cinnamon and on mandarins. At Horticultural Research Station, Periakulam, the main work was on the tristeza disease of acid limes and also on tropical fruit crops and vegetables. The Forestry Research Station at Mettupalayam was concerned mainly with several problems on *Ecualyptus*. Research on different aspects of cashewnut cultivation was being carried on at Vridhachalam.

A brief summary of the important rasearch findings on the above crops is furnished below:

TABLE 42. Effect of varying doses of N on the yield of fruit and papain in Co.2 papaya

Treatments (g/plant)	Mean yield		
	No. of fruits per tree	Fruit yield per tree (kg)	Papain yield per fruit (g)
N 125	36	73	5.8
N 250	45	104	5.9
N 500	37	76	6.4

Under sandy clay loam soils papaya can stand depletion of 40 per cent of available soil moisture which would correspond to 83 irrigations during its active growth period of 2 years. This would amount to 214 ha-cm of water. Under 40 per cent depletion one ha-cm of water yielded 864 kg of fruits and 2.75 kg of papain. The water use efficiency declined when irrigations were given at wider intervals (Table 43).

TABLE 43. Water use efficiency in Co.2 papaya

Depletion of ASM	No. of irrigations	Water used (ha-cm)	Water use efficiency (kg/ha-cm)		Cost benefit ratio	
			Fruits	papain	Fruit	papain
40	83	214	864	2.75	2.6	1.3
60	51	210	698	2.27	2.1	1.1
80	33	182	577	1.94	1.6	—

(iv) **Mango :** In an investigation to find out the causes for the regularity of flowering and fruiting in pruned and shoot cluster thinned Mulgoa mango, the level of endogenous ethylene was found to have reached the highest in the tissues soon after the treatment.

(v) **Guava :** At Madurai, foliar application of K_2O (1 per cent) with neutralized zinc (1.0 per cent) increased the yield of guava by 11.7 per cent in Smooth Green, 67.7 per cent in Chittidar and 66.5 per cent in Lucknow-49. Application of zinc alone caused foliar injury at concentrations above 1 per cent. At Periakulam, in manurial studies on guava (variety Lucknow-46) application of N, P and K, each at 1 kg per tree, was found to give the maximum yield of fruits viz., 2686 (110.03 kg) per tree.

(vi) **Sapota :** At Periakulam, a new sapota selection viz., AZ-16 being clonal selection rom the variety '*'Guthi'*' was spotted as most promising which, besides bearing choice fruits with better taste and sweetness, gave the highest mean yield of 3547 fruits (236 kg) per tree from 20 year old trees. It has got other desirable attributes like medium growth being suitable for high density planting.

(vii) **Citrus fruits** : At Yercaud, in a comparative study of different rootstocks for mandarin orange, Rangpur lime seemed to be good till the age of three in giving more yield and quality. Rangpur lime rootstock gave a mean yield of 129 fruits weighing 19.645 kg followed by Troyer Citrange which gave 32 fruits weighing 3.68 kg. The other rootstocks, viz., Rough lemon and Cleopatra Mandarin gave 12 and 5 numbers of fruits weighing 1.18 and 0.70 kg, respectively. The lowest yield was given by Kodaikithuli rootstock numbering 2 fruits weighing 0.25 kg. In manuring of mandarins, it was found that K at 100 g per tree in combination with 50 g of N and P per tree per year of age induced early bearing.

In acid lime, N at 400 g per plant in combination with P at 200 g and K at 300 g was found to give the highest yield in a three year old tree, besides registering appreciable growth and vigour, at Periakulam.

A fertilizer dose of 600 g of N, 200 g of P and 400 g of K per tree was found to give the maximum yield in mandarin orange under Lower Palni hill conditions.

(viii) **Other tropical fruits** : At Yercaud, out of 47 collections in pomegranate, one selection (No.29) was found to be precocious and yielded fruits at the age of two. Pomegranate plants trained to single stem with four scaffold branches gave the maximum height of 76.2 cm against 59.5 cm in untrained plants. In nutritional experiment on pomegranate, it was found that the height and spread of the plant were more with the highest level of N, P and K, viz., 50 g N, 200 g P and 100 g K per tree per year of age.

At Yercaud, among eight collections of fig the varieties Poona, Rajwadi and Kalhatti were found to be precocious. In jack, ninety selections were collected and planted, of which selections number 3, 10 and 15 were found to be vigorous in growth

Budded plants of thrree varieties *Seemai Ilandai* (*Zizyphue mauritiana*) introduced from North Indian States flowered and fruited under irrigated coudi-tions in Coimbatore within 18 months after planting.

(ix) **Temperate fruits**

Apple : At Kodaikanal. application of 500 g N and 500 g P_2O_5 per tree recorded the highest yield of 5.5 kg with 45 fruits per tree. In the early, mid-season and late varieties fruits harvested 110, 150 and 130 days respectively after fruitset recorded the maximum fruit weight and highest percentage of total and reducing sugars.

Strawberry : Among the ten varieties evaluated during the year, Black More recorded the maximnm fruit yield cf 159.25 g per plant followed by Gorella with 155.13 g per plant.

OLERICULTURE

(i) **Sweet Potato :** The promising clone IB. 81 has been released as CO.2 sweet potato during January, 1980. It yielded on an average 31.7 tonnes of tubers per hectare with 23 per cent increase over CO.1. The crop duration was less i.e., 110 to 115 days which was 25 to 20 days lesser than CO.1. Plants were less susceptible to root weevil (10-15%) Plants were dwarf and erect. Tubers were medium sized with light pink skin and white flesh rich in starch (29.5 per cent) and carotenoides(3.2 mg/100 g). The clone was suitable for raising during June-July to September-October and September-October to December-January. It gave a net profit of Rs.8000 to 9000 per hectare within a crop duration of 115 days.

Growth and development of sweet potato clones IB.2, IB.81 and IB.440 were studied. The length and diameter of the main axis, number of leaves and foliage weight per plant increased upto 120 days and declined thereafter. The number of laterals increased upto 105 days and then declined. The number of tubers per plant and tuber length increased to maximum at 105 days after planting and thereafter it declined. IB.2 recorded the highest number of tubers per plant and IB.81 recorded the maximum tuber length. IB.2 recorded the highest tuber girth and IB.81 recorded the greatest tuber weight per plant.

Weevil incidence was noticed from 90 days after planting and increased thereafter till the final stage. The maximum infestation was observed at 105 days in IB.2, IB.81 and 120 days in IB 440. The starch and amylose contents were directly related to weevil infestation, while amylopectin was indirectly related.

(ii) **Tapioca :** Studies on tillage requirements in tapioca have indicated that treatment of no tillage + mulching with banana stems at 12 tonnes per hectare has recorded 24.44 tonnes of tubers per hectare. This was followed by the treatment of no tillage + mulching with cumbu stalks registering 23.86 tonnes tubers per hectare. These two treatments have recorded increased yields of 8.06 and 5.52% respectively over control plots with conventional tillage.

(iii) **Tomato :** IM.39 was a promising mutant identified for its dwarf stature and earliness with a crop duration of 110 days compared to 135 to 145 days in CO.1 and CO.2 respectively. The desirable plant characters of this mutant offer scope to increase the plant density by adopting a spacing of 60 x 30 cm as against a recommended spacing of 75 x 60 cm for other varieties. It yielded 1.5 to 2.0 kg of fruits per plant with a hectare yield of 43 tonnes. The fruits were medium sized and globular in shape. The mutant was under pre-release test.

In a heterosis breeding programme, three female parents namely, LE.719, LE. 720 and LE.729 were crossed with three pollinator parents namely CO.2,

IM.39 and LE.573. The resulting nine hybrids and the six parents were evaluated for their *per se* performance and the superiority of the hybrids was expressed in terms of heterosis. The hybrid LE.719 x IM.39 recorded the highest heterosis of 47.74% over the mid parent, 40.69% over the higher parent and 36.08% over best parent. The other two hybrids which were of promise were, LE.720 x LE.573 and LE.719 x LE.573 showing heterosis of 36.08 and 33.98% over the best parent respectively.

Four F1 hybrids namely, Karnataka, Processing, Determinate 1 and Determinate 2 were exposed to gamma rays at 25 and 50 Kr and M1 progenies were evaluated in comparison to untreated control. Among the different treatments, the 25 Kr treatments of Processing and Determinate 2 hybrids excelled their respective untreated controls by 179.4 and 46.6% respectively, in respect of fruit yield.

Attempts to isolate drought tolerant types of tomato revealed that, the the types LE 573, 758 and CO.1, CO.2 and PKM 1 have been found to possess drought tolerance under laboratory conditions. In salt tolerance studies, PKM.1 tomato was found saline tolerant. While assessing the suitability of different types of soil and water for growing tomato, it was found that clay soil having pH. 8.4 and EC.2.8 and irrigation water with pH. 8.5 and EC.0.9 were highly favourable to obtain high yields. Soil (pH 7.8 and EC.10.3) and water with high EC 4.5 suppressed the yield and size of fruits.

(iv) **Chilli :** The selection CA(P) 63, from a gundu type collected from Nambiyur of Coimbatore district was tested from 1972 to 1977 for six seasons at Coimbatore along with G.5, a promising variety under cultivation. The selection recorded a mean dry pod yield of 1970 kg per hectare in a crop duration of 210 days which was 24.9 par cent increase over G.5. It was suitable for cultivation both in summer and monsoon sseason. Fruits matured in 145 days from sowing. Pods were short (4.1 cm length) and stout (5.1 cm girth) with bright red colour on ripening. The seed content of pods was high i.e., 60 per cent. The capsaicin content of green and dry pods were 0.38 and 0.56 per cent respectively.

(v) **Amaranthus :** In the germplasm collection, three clipping types of Amaranthus *(A. tristis)* viz., A 49, A.78 and A.83 were selected and tested in yield trials along with the local type as control. The results have indicated the superiority of A.83 which recorded a mean yield of tender greens weighing 23.010 kg per plot of 6 sq m. for a clipping period of 70 days with an estimated yield of 38.35 tonnes per ha accounting for 91.7 per cent increase over the local variety (19.95 tonnes of tender greens per hectare). First clipping can be done on 20th day after sowing and further clippings at weekly intervals. This type lends itself for ten clippings within a short duration of 90 days, compared to 6-8 clippings in the local type. A total number of 12 to 15 branches were produced per plant. The stem and leaves were green with pink petiole.

(vi) **Onion :** The performance of sixteen types of Bellary onion (*Allium cepa* L) was studied for five seasons from 1973. It was found that two varieties namely Bellary Red (Local) and N.53(Rahuri) excelled other varieties in yield and bulb characters. The over all mean yield of Bellary Red was 20.84 tonnes and that of N.53 was 20 60 tonnes per hectare. The yield of bulbs in other types ranged from 7.05 tonnes in Kalyanpur Red (Sabour) to 20.52 tonnes in Udaipur 101. The weight of single bulb of N.53 was 82g while it was 76g in Bellary Red. The T.S.S. content of the varieties did not vary much and ranged from 9.4 per cent in Hissar II to 12.2 per cent in Bellary Red. The T.S.S. cnntent of N.53 was 10.3 per cent.

Biometrical studies in aggre gatum types have indicated that high mean expression and high *gca* effects were observed for lines P1 (CS.856-8) and P10 (CS.665-51) and testor (T1 (CO.1) for yi... P1 x T1 (CS.856-8 x CO.1) and P10 x T1 (C... exploitation of hybrid vigour.

Among the ten lines, AC.863 was found to be a go... for yield and its components. The tester AC 874 was a ... based on the *per se* performance of testers. The hybrid ... the most heterotic with 28.99 per cent heterosis ove... other promising hybrid was AC.872 x AC.875 which sho... for yield and favourable negative heterosis for storag... bulb weight, number of bulbs per plant and plant w... correlation with bulb yield.

In Aggregatum type, 30 hybrid derivatives w... with CO.3 onion. A total number of 13 hybrids w... yield and they have recorded 2 to 32 per cent increase... Among the 13 hybrids 7B recorded the highest yiel... per hectare which was 32 per cent over CO.3 onion. (17.00 tonnes).

A trial has been laid out to fix up the kind an... fertilizers required for CO.3 onion. Four levers of nitro... 80 kg N/ha in the form of urea and ammonium sulphate ... split doses, one as basal and the other 30 days after. ... constant at 60 kg P_2O_5 and 30 kg K_2O and applied as ba... indicated that the application of fertilizer in the form of... the highest yield of 15.24 tonnes per hectare, followe... kg N in the form of ammonium sulphate (14.42 t/ha). B... in the form of urea instead of ammonium sulphate at 6... profit of Rs 466/ha could be realised.

(vii) **French Beans :** To assess the extent of genetic ... ation of yield and its components, studies were undertaken on ...

...Yield and yield components. The hybrids
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...are yield of 43 tonnes. The
...The mutant was under pre-

...parents namely, LE.719,
...parents namely CO.2,

bush beans and 15 genotypes in pole beans. In bush types Pv.12, Pv.28, Pv.52 and Pv.152 recorded higher green pod yields. In pole types Pv.153 and Pv.42 were consistant in recording higher yields in all the three seasons. Among the nine traits studied, green pod yield showed higher genotypic and phenotypic variance in both the types compared to other characters. Green pod yield and number of pods showed high heritability estimates in pole beans whereas in bush beans it was recorded for green pod yield, number of pods and days to first bloom. Positive and significant association existed between green pod and number of pods in both the types.

Performance of 31 varieties of bush beans was studied for three seasons from 1976. The results have indicated the superiority of the variety 'Premier' for the plains registering a mean yield of 15.52 tonnes per hectare. The other promising varieties were Master Piece, Stringless Grey Pod and Bountiful. These varieties have been recommended for cultivation in the plains of Tamil Nadu ...soon and winter seasons.

Attempts t
the types LE 573, 7E
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tomato was found sai
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(iv) **Chilli** :
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(v) **Amaranthus**
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Thirty two types of carrot were evaluated to ascertain
components. The types DC 18 and DC 25 recorded the
ce for shoot weight and shoot root ratio For the trait
, DC 14 and DC 50 gave the highest mean performance.
registered the highest mean performance for shape
d root yield. The types DC.4, DC.20 and DC.6 consis-
ot yields. Genotypic and phenotypic co-efficients of
r shoot/root ratio and this was followed by root yield,
tant, slenderness co-efficient, root length and days to
ty estimates were accompanied with high genetic
yield, shape constant and shoot weight. A highly
sociation existed between root yield and root length
typic levels.
h 32 varieties of carrot for five seasons from 1976
eties for the plains have indicated that the varieties
Half Long Danvers performed well recording mean
2.23 and 11.52 tonnes per hectare respectively. Both
Danvers did not set seeds in the plains whereas Pusa
nder normal conditions in the plains.
hybridisation programme through line x tester analysis
testers was undertaken to identify good combiners for
ramme. The lines included in the crossing programme
AE. 599, AE 711, AE. 712, AE. 719, AE. 722, AE, 752,
74, AE. 981, AE. 988 and AE 1068 and testers were
142 and AE. 180. A critical evaluation of the
hybrids revealed that the lines AE. 1068 and AE. 800
ral combiners. The most outstanding hybrid was AE. 1068 x
as recorded a calculated hectare yield of 32 tonnes and the

hybrid recorded a hectrosis of 31.42 per cent over the parent (AE. 180). For the commercial exploitation of hpbrid vigour in bhendi, the lines AE. 1068 and AE. 800 and the testers AE. 180 and AE. 142 could be identified.

(x) **Radish :** Selection programmes in radish for 3 seasons with 15 types have enabled for selecting a promising culture RS. 44 which yielded on an average 22.09 tonnes of roots per hectare in a crop duration of 40 to 45 days. The increase in yield was 54.7 per cent over Pusa Rashmi. The per plant yield was 219g. Roots were white, long (22.9 cm), thick (12.5 cm girth) and contained 10.9 mg/ of ascorbic acid,100 g of root 1.2 per cent crude fibre and 1.40 per cent drymatter.

The plant height was 62.69 cm with a mean of 18.8 leaves per plant with a top/root ratio of 1.35. The culture set seeds under normal conditions in the plains.

FLORICULTURE

(i) **Jathimalli** *(Jasminum grandiflorum)* : Six Jathimalli selections were tested for their yield of flower buds jasmine concrete. The data are presented in Table 44.

TABLE 44. Yield of buds and jasmine concrete.

Selection	Mean yield of flower bud (kg/ha)	Jasmine concrete recovery (%)	Calculated jasmine concrete yield (kg/ha)
JG.1	6804	0.29	19.70
JG.2	4330	0 32	13.85
JG.3	10152	0.29	29.42
JG.4	6276	0.28	17.58
JG.5	10051	0.27	27.14
JG.6	8320	0.25	20.81

The selection JG.3 has been released as Co.1 Pitchi during this year. It was a secondary selection from Lucknow clone and was suitable for growing throughout Tamil Nadu. It gave a high yield of 10.15 tonnes of flowering buds per hectare with a jasmine concrete recovery of 0.29 per cent. The colour of the flower bud was pink and attractive. The selection can be grown for fresh flower market as well as for jasmine oil industry.

The studies on economics of fresh flower marketing and concrete production in *Jasminum grandiflorum* indicated that the calculated net income from the sale of fresh flower was Rs. 35,507 while it was Rs. 89,092 per hectare if jasmine concrete was extracted and disposed at Rs. 7000/kg of jasmine concrete.

The effect of applications of two levels of fertilizers in 2,6 and 12 splits on flower yield of *Jasminum grandiflorum* was studied and the date are presented in Table 45.

TABLE 45. Effect of split doses of fertilizers on flower yield

Treatment			FYM (kg/plant)	No. of doses	Yield (kg/ha)
N	P	K (g/plant).			
120	240	240	30	2	7974
120	240	240	30	6	8149
120	240	240	30	12	8416
60	120	120	15	2	7742
60	120	120	15	6	8639
60	120	120	15	12	8629

There was no significant difference in yield among the different treatments. Hence the fertilizer dose of NPK at 60 : 120 : 120 g plus 15 kg of FYM per plant per year in two split doses involving lower dose of fertilizer and minimum number of application was recommended for securing optimum yield of flowers.

(ii) **Mullai** *(Jasminum auriculatum)* : Twelve selections were tested and compared with the variety Parimullai. The data on yield of flower buds and flower bud characters are presented in Table 46.

TABLE 46. Yield and flower bud characters of Mullai selection

Selection	Mean yield of flowers/ha	Corolla tube length (cm)	Bud length (cm)	Total flower bud length (cm)	Jasmine concrete recovery(%)
LR	8802	1.52	0.93	2.45	0.34
LP	4733	1.66	0.95	2.60	0.30
SR	9152	1.18	0,79	1.97	0.28
SP	5096	1.15	0.82	1.96	0.36
15	5576	1.25	0.85	2.09	0.32
24	11302	1.26	0.84	2.10	0.41
31	4276	1.25	0.83	2.08	0.34
35	4453	1.36	0.81	2.17	0.33
48	2106	1.33	0.82	2.15	0.32
71	5423	1.37	0.84	2.26	0.39
70	5183	1.22	0.82	2.04	0.28
72	7836	1.32	0.81	2.13	0.37
Parimullai	7089	1.30	0.99	2.29	0.29

Among them, the selection LR has desirable flower bud character like long corolla tube and bold bud. It recorded 8802 Kg of flower buds while parimullai gave only 7089 Kg per hectare. The jasmine concrete recovery in LR was 0.34% while it was 0.29% in Parimullai. This selection was released as

Co.1. Mullai. it has better consumer preference than Parimullai due to its bolder bud and longer corolla tube.

(iii) **Rose:** Nine spacings were tried for Edward Rose and the yield data under different spacings are presented in Table 47.

TABLE 47. Yield of flowers in Edward Rose under different spacings

Treatment	Yield (kg/ha)
3.0m x 2.0m	3830
3.0m x 1.5m	4749
2.0m x 2.0m	4880
3.0m x 1.0m	6205
2.0m x 1.5m	6573
1.5m x 1.5m	6651
2.0m x 1.0m	7190
1.5m x 1.0m	7756
1.0m x 1.0m	9332

Out of nine different spacings tried in Edward Rose it was found that closest spacing of 1.0m x 1.0m recorded the highest yield of (9332 Kg/ha). But it was found difficult to harvest the flowers in such closely planted bushous. The next high yield of 7756 Kg of flower per hectare was obtained in 1.5m x 1.0m spacing and under this spacing harvesting of flowers was not difficult as in the case of 1.0m x 1.0m spacing and hence the spacing 1.5m x 1.0m is recommended. This treatment has recorded 102 per cent increased yield over the wider spacing of 3.0m x 2.0m.

(iv) **Crossandra:** Three varieties and two hybrids were tested for their yield of flowers. The data on yield of flowers are presented in Table 48.

TABLE 48. Yield of crossandra flowers (Kg/ha)

Selection	Yield	Remarks
Red Crossandra	2114	Tolerant to nematode and wilt
Hybrid No.1	725	Susceptible to nematode and wilt
Hybrid No.2	5105	Tolerant to nematode and wilt
Tudialur	-	The plants did not establish in the field due to high susceptability to nematode and wilt
Orange Crossandra (control)	338	Susceptible to nematode and wilt

The crossandra hybrid No.2 was promising in yield of flowers due to its tolerance to nematode and wilt. The flowers were attractive with orange yellow colour and larger sized petals.

(iv) **Barleria**: Seven Barleria selections were tested for thier yield of flowers. The data on yield of flowers are furnished in Table 49.

TABLE 49. Yield of Baleria flowers (kg/ha.)

Selection	Mean yield of flowers/ha (Kg)
Pink	6764
Striped	5247
White	2253
White mutant	4820
Light Pink	1754
Violet (control)	4603
Violet mutant	5349

The selection Pink Barleria produced higher yield of flowers (6764 Kg/ha) than the common violet Barleria (4603 Kg/ha). The consumer preference is more for the Pink Barleria as the flowers are more attractive and hence higher price is offered in the market. By growing the pink Barleria, more profit can be realishd over violet Barleria.

(v) **Marigold**: Thirty six varieties were tested fo rtheir performance of yield and quality of flower. The following varities were found to be promising. The observations recorded on the promising varities are furnished in Table 50.

TABLE 50. Performance of Merigold varieties

Name of the variety	Plant height (cm)	Flower diametre (cm)	Colour of flowers	No. of days flowering
Harmony	18.0	3.2	Yellow	49
Dholy 1	16.5	2.23	Orange	45
Dholy 3	53.0	3.80	Yellow	40
Rusty Red	58.2	2.3	Deep orange	45
Spray	23.8	3.1	Yellow	46
Craker Jack	35.8	6.2	Orange	48

These new varieties can be grown for their attractive colour and yield of flowers in the ornamental gardens.

(vi) **Zinnia**: Fourteen varieties of Zinnia were tested for their resistance to leaf curl diseaee under field condition. Among them, nine varieties viz., Canary Bird, Polar Bear, Metaor, Cupid, Exquisite, Prince, Mexican hybrid,

Lilliput fine and Lilliput double were found to be free from leaf curl disease. The resistant varieties can be advantageously grown in ornamental gardens.

(vii) **Gaillardia** : In order to induce dwraf and compact plants with better sized flowers and more yield in flowering annuals for display in garden and plant boxes, a study was made with growth retarding and inhibiting chemicals on Gaillardia. The data collected are presented Table 51.

TABLE 51. Chemical regulation of growth and flowering in Gaillardia

Treatment (ppm)	Height at flowering (cm)	No. of laterals at flowering	No. of flowers/ plant	No. of days for first flowering
MH 1000	53	9	26	71
MH 2000	56	10	33	73
CCC 1000	63	7	28	80
CCC 2000	62	8	31	85
Alar 500	63	6	23	90
Alar 1000	70	8	20	92
Ethrel 500	64	6	23	90
Ethrel 1000	68	5	20	70
Control	59	7	23	85

Maleic Hydrazide (MH) at 2000 ppm has reduced the height and increased the laterals and number of flowers in addition to inducing earliness in flowering.

SPICES, PLANTATION CROPS, MEDICINAL AND AROMATIC PLANTS

(i) **Cashewnut :** At Vridhachalam, among the 465 cashew types studied for their yield, five types recorded more than 10 kg during 1979. Among the 26 clonal progenies, K.20/5 gave the highest yield of 30.69 kg/tree confirming its earlier performance. Air layering was found to be a simple and practicable method of raising clonal progenies. Three selections viz., M.10/4, M.76/1 and M.6/1 were identified for their high yielding potentiality and consistency of heavy bearing over years.

It was observed that the stem borer pest of cashew could be controlled effectively by application of 1 per cent solution of fenitrothion through a hole bored on the trunk near the base of the tree, provided the infestation was detected in its early stages. A cultural schedule consisting of (a) irrigation once in 10 days (b) manurial application with 25 kg farm yard manure; 250 g N, 125 g P_2O_5 and 125 g K_2O per tree per year and (c) spraying the trees with endosulfan at 0.05 per cent at the time of flowering contributed to a significant two-fold increase in cashew yields.

(ii) **Arecanut :** In the varietal trial with five improved CPCRI selections in comparison with local (Mettupalayam type), VTL-3 (Mangala) registered

more vigorous growth represented by higher values for height (1.37 metres) and girth (23.92 cm). In mean weight of green nuts, and processing out-turn, VTL selections were superior (Table 52).

TABLE 52. Growth, nut and processing characteristics of arecanut selections

Selection	Mean tree height after 45 months (cm)	Mean tree girth after 45 months (cm)	Mean weight of green nut (g)	Processing out-turn (ratio of green to cured)
VTL-3	137	23.92	22.92	18.5 : 1
VTL-11	66	12.63	24.85	20.0 : 1
VTL-12	109	18.10	23.30	18.5 : 1
VTL-13	151	19.39	21.11	18.5 : 1
VTL-17	126	21.99	19.95	18.5 : 1
Local (Mettupalayam)	83	15.97	17.89	20.6 : 1

The preliminary data showed that selections VTL.3, 12 and 13 possessed superior traits like bolder and heavier nuts and larger processing outturn.

(iii) **Turmeric:** In the evaluation of 308 types in the last three years, a mutant selection 5307-1-1 has been noted to out yield all the others. This selection was characterised by vigorous growth, growing to a height of 47 cm with 16 leaves in 120 days. In 1979, this selection recorded an yield of 441 g of green rhizomes per plant against 303 g in the local (Erode) type. It has been selected as a pre-release culture and will be advanced to multi-location trials in future.

The response of turmeric to higher doses of N evaluated. While N at 160 kg/ha produced the tallest plants, the highest yield (26.26 t/ha) was registered at 140 kg ha. While at this dose, the cost of input (N fertilizer) would be higher by Rs 420/ha, the additional income due to higher yield would be Rs. 3955/ha.

An inter cropping trial was conducted to utilise the initial vegetative phase of the turmeric crop to raise some remunerative short duration crops. Among bhendi, *aggregatum* onion, blackgram and greengram, small *aggregatum* onion planted on the otherside of the ridge found to be the best for increasing the net income per unit area without affecting the turmeric yields. Turmeric-onion combination gave a net additional income of Rs 3491/ha compared to Rs. 925 to 2693 in the other combinations. (Table 53).

TABLE 53. Economics of intercropping in turmeric

Particulars	Turmeric alone	Turmeric + bhendi	Turmeric + onion	Turmeric + black-gram	Turmeric + green gram
Yield of turmeric (t/ha)	16.62	15.58	20.16	16.27	16.80
Total gross income (Rs/ha)	8305	11748	12436	9440	9765
Cost of cultivation (Rs/ha)	5580	6330	6220	5790	5790
Total net income (Rs/ha)	2725	5418	6216	3650	3975
Additional income over turmeric alone (Rs/ha)	—	2693	3491	925	1250

In a tillage experiment in turmeric involving different types of mulching meterials, mulching with maize cobs resulted in increased yields of 44.90 per cent over conventional tillage and 50.84 per cent over no tillage with plots mulched with banane pseudostem at 24 t/ha ranking second.

A study was conducted to enhance rate of rhizome prodution for rapid multiplication by treatments involving different type of seed materials, spraying growth retardants and cutting aerial parts of the plant at different stages of the crop growth. Split halves of mother rhizomes recorded the highest quantity of rhizomes per plot followed by CCC spray at 500 ppm. Cutting the plants 2 months and 3 months after planting to force more rhizome production was not beneficial and depressed the yield.

(iv) **Coriander :** A selection P_9 introduced from Gujarat yielded more than Co.1 for the third year in succession. Under irrigation, P_9 recorded a mean yield of 620.7 kg of grain per ha compared to 557.7 kg/ha in Co.1, accounting for an yield increase of 10.15 per cent. Its duration was the same as Co.1 (115-120 days) and it produced more number of primary and secondary branches and umbels per plant than Co.1. P_9 has been selected as a pre-release culture.

Two leafy types (CS 36-0 and CS 36-3) were identified as suitable for growing as greens. They were late to flower and produced broader and more abundant leaves as compared to early flowering habit and narrower leaves Co 1.

Dry seeds of Co. 1 coriander were subjected to gamma irradiation (5 kr to 25 kr) to induce desirable mutants. Quantitative variations were noted in the first generation indicating the possibility of selecting desirable mutant types in subsequent generations. All the characters except plant height and germination percentage showed a positive shift (Table 54). A total of 191 plants have been selected for study in subsequent generations.

TABLE 54. Effect of gamma irradiation in Coriander

Characters	Control plants	Irradiated plants	Effect of irradiation
Plant height (cm)	84.58	71.93	— 12.65
No. of primary branches	6.99	8.66	+ 1.67
No. of secondary branches	17.69	20.23	+ 2.54
No. of umbels/plant	31.88	42.28	+ 10.40
No. of seeds per plant	273.77	389.18	+115.41
Yield/plant (g)	2.89	4.23	+ 1.36
Germination percentage	89.97	76.44	— 13.43

(v) **Fenugreek :** The performance of fenugreek was found to be better in winter than in monsoon season. Among 10 types studied in compar-

tive yield trial for the past two years, the selection TC 2336 has been consistant high yielding with an yield of 330 kg/ha. The duration of this selection was 85 days.

Mutation breeding was taken up in fenugreek with gamma irradiation at doses ranging from 5 kr to 25 kr to evolve high yielding types with high diosgenin content. In M_1 generation, except in plant height and germination percentage, positive values were noted in other quantitative characters indicating the scope for selecting desirable mutants. A total of 184 individual plants have been selected and put under evaluation in M_2 generation.

(vi) **Oilpalm** : An investigation was carried out for hastening the germination of oilpalm seednuts. Removing the husk and soaking in water for a week before sowing registered the highest (53 per cent) germination and quicker germination (98 days). Planting whole nuts or only kernels with or without water soaking recorded less germination. Planting the kernels alone registered only 6 to 12 per cent germination.

(vii) **Chicory** : In a spacing cum manurial trial, a close spacing of 20 x 15 cm recorded more tuber yield than 30 x 20 cm or 40 x 30 cm. In manuring, the response to different levels of P and K was studied under a constant N dose (80 kg/ha). The mean yield under all the spacings was in favour of 75 kg of P_2O_5 and 100 kg K_2O per hectare. For securing higher yields in chicory therefore, a close spacing of 20 x 15 cm in bed system and fertilising with 80 kg N, 75 kg P_2O_5 and 100 kg K_2O per hectare can be adopted.

(viii) **Cardamom** : Thadiankudisai studies on the tiller production in cardamom under different spacings viz., 120, 150, 180, 210, 240 and 270 cm indicated that 240 cm spacing produced the highest number of tillers (14) while only 10 tillers were observed under 120 cm spacing.

(ix) **Geranium** : At Kodaikanal, in the propagation of geranium, terminal cuttings were found to be the best planting material, recording 84.5 per cent of rooting. Application of 60 kg each of N, P and K per hectare has recorded the highest herbage yield of 25,794 kg/ha. In another experiment, application of 15 kg of N as basal and 15 kg as top dressing in two foliar sprays of 1 per cent urea solution 45 and 90 days after basal application recorded the highest herbage and oil yield of 12,583.36 kg and 11.29 kg/ha respectively. Application of Tok-E-25 at 4 litres/ha as pre-emergence spray recorded the highest weed kill of 63.96 per cent with a herbage yield of 10,120.05 kg/ha. Application of Zn at 40 kg, Mn at 10 kg and B at 10 kg/ha recorded the highest herbage yield of 21,079 kg/ha.

(x) **Mint** : In the propagation of mint at Kodaikanal, the runners and stem cuttings recorded the maximum rooting of 62.0 and 56.0 per cent

respectively. Planting of *Mentha citrate* during September-October was found suitable for Kodaikanal recording 90 to 94 per cent establishment. A spacing of 40 x 40 cm was found optimum recording a hectare yield of 7275 kg.

(xi) **Pyrethrum** : Application of 20 : 120 : 20 kg N P K per hectare registered the maximum yield of 872.99 kg of dried flowers per hectare. The weed control studies have shown that application of Tok-E-25 at 4 litre/ha as pre-emergence spray plus hand weeding 45 days after chemical spray has controlled the weeds to an extent of 81.52 per cent, recording an yield of 44.65 kg of dried flowers per hectare.

(xii) **Digitalis** : Application of 60 kg N, 30 kg P_2O_5 and 30 kg K_2O per hectare recorded the highest yield of 2898.15 kg of dried leaves per hectare as against 2000 kg in control. The leaves were found to contain the maximum glycosides (0.35 to 0.36 per cent) during June to August and the third whirl of leaves recorded the maximum amount of glycosides.

(xiii) **Vinca** : At Madurai the optimum N dose for Vinca (*Cathranthus roseus*) was found to be 100 kg/ha. To maximise the yield, weekly irrigation was found to be essential.

FOOD TECHNOLOGY

(i) **Fruits and Vegetables** : Tomato drink with 10 per cent Brix, 0.5 per cent acidity, 0.3 per cent salt and 100 ppm of sodium benzoate was found acceptable but sedimentation during storage was noticed even after the addition of gum acacia.

Preparation of preserve and candy from ash gourd was standardised. Pickling of ash gourd at 15 per cent salt concentration was found good.

The studies on packing and storage of limes in polythene bags with vents and without vents and without packing under room temperature and under moist sand conditions were carried out. It was found that the limes could be stored under sterilized moist sand for a period of 15 days and limes kept under sterilized moist sand and with polythene packing remained good for more than 30 days and those stored with vented polythene bags under sterilized moist sand remained good for 15 days. There were only slight changes in the vitamin C, weight loss, sugar content and acidity of the juice. The same type of study was repeated with carrot, bhendi, raw tomato and oranges. It was noticed that raw tomatoes and oranges packed in poybags and kept under moist sand remained good for 16 and 19 days respectively.

(ii) **Mushrooms** : Pickling of mushroom was standardised and popularised.

(iii) **Tubers-Tapioca :** Dehydration characteristics of partially cooked tapioca chips were studied. These chips were used for the preparatian of suji. It was found that drying in thicker layers increased the period of dehydration at all temperatures. Falling rate period was encountered after the initial 6 hours Maximum drying rate was obtained at lower tray loadings at 90°C and this was followed by 80°C and 70°C respectively. At 90°C the drying time required was 6-8 hours for optimum dehydration while at 80°C the drying time required was 8-10 hours and at 60°C it took more than 13 hours.

(iv) **Fortification of Sago :** Sago was fortified with minerals (calcium and iron) and vitamins (A and B_1). 50 g of the fortified sago would supply 0.4 g of calcium, 15 mg of iron, 1000 I.U of vitamin A and 1.0 mg of thiamine A feeding trial was conducted on the fortified sago with children belonging to the age groups 7 to 12 years. There was an increase in all the anthropometeric measurements and a significant difference in Hb content between the control and the experimental group of the children. Cooking loss and storage loss of vitamins were studied on the fortified material.

(v) **Survey for the presence of mycotoxins in foods and feeds :** Out of a total number of 2,712 samples collected and analysed, 112 samples were found to be contaminated with different mycotoxins. Sterigmatocystin was found in twenty samples of rice and wheat and 2 samples of cotton seed. Patulin was detected in one sample of scented supari and Penicillic acid in one sample of apple. Aflatoxin was the chief contamination in various commodities. These included cotton seed (2 out of 30 samples), groundnut cake (28 out of 134 samples), gingelly oil cake (4 out of 83 samples), coconut oil cake (3 out of 96 samples), groundnut candies (4 out of 91 samples). lime pickles (6 out 37 samples), dried vegetable (4 out of 43 samples), dried dates (1 out of 18 samples), supari and arecanut (3 out of 147 samples) and dried coconuts (2 out of 6 samples).

FORESTRY

(i) **Bamboos :** The field experiments on the agronomic studies on nursery stock of bamboos, viz., *Bambusa bambos* and *Dendrocalamus strictus* with nine levels of nitrogen with a constant spacing of 30 cm either way revealed that the treatment differences did not reach levels of significance.

A pot culture experiment to study the regenerability of cut segments of the rhizome chains derived from 6 month old seedlings of bamboos (*Dendrocalamus strictus* and *Bambusa bambos*) revealed that the regenerability was more (1:7 multiplication in terms of propagules created) in the case of *Bambusa bambos* as compared to *Dendrocalamus strictus* (1:2 multiplication).

(ii) **Eucalyptus :** Biometrical data recorded in the progeny trials of *Eucalyptus* raised at Forestry Research Station, Mettupalayam, Pallipalayam and Onangudi revealed that 12 single tree selections were found to be promising. The increase in girth at breast height was ranging from 1.19 to 14.85 per cent. The data on the plant height of inter and intra specific hybrid seedlings indicated that the inter specific cross combinations of *E. camaldulensis* X *E. tereticornis* recorded the maximum plant height of 1.59 meters which showed 21.37 and 9.65 per cent heterosis over mid and better parental value. Its reciprocal recorded 1.47 meters which shows 12.21 and 1.37 per cent heterosis over mid and better parental value. The intraspecific cross combination of *E. tereticornis* 3 x *E. tereticornis* recorded a plant height of 1.46 meters which shows 28.63 and 14.06 per cent heterosis over mid and better parental value.

Biometrical data recorded in the trial laid out for the study of association of seedling vigour with adult performance revealed that 10 noded seedlings recorded increase in girth at base and breast height, the increase being 9.04 and 11.88 per cent respectively over general mean. The data on the suitability of different soil media revealed a large variation in germination and initial growth habit of *Eucalyptus* single tree selection between the pot mixture and shola soil. The percentage of germination was more in shola soil than in the pot mixture. The growth potentiality for the production of large number of vigorous seedlings was expressed better in the shola soil than in the pot mixture.

Biometerical observations recorded in *Eucalyptus* coppice stand at Rajendram, Tiruchy District in 428 stools indicated that the girth at breast height had increased from 1 cm to 9 cm in about 8 months period. The maximum increase was between 3 cm and 5 cm. The self-thinning process of the coppice shoot had over.

Attempts to increase the percentage of success (36.1 per cent) in rooting of *Eucalyptus* stem cuttings were tried by different methods such as changes in the medium of rooting, age of cutting, combination of growth regulators, temperature, relative humidity and etiolation of seedlings. Though the treatments were not effective in increasing the percentage of rooting of cutting, the treatments IAA 1500 ppm and IBA 1000 ppm and combination of IAA+IBA were better than others recording 25 to 31 per cent rooting of cuttings Dipping of base of cuttings for 18 hours in Ethrel 1 per cent solution and IBA 1000 ppm and 20 mg glucose per litre of solution to induce better rooting was not effective.

At Mettupalayam, studies were conducted with a view to eliciting information on the ideal nursery medium that would promote healthy and vigorous *Eucalyptus* seedlings. Six nursery media, viz., native soil, sand, shola soil, soil+sand, sand+shola and soil+shola, the combinations being

in equal proportions were employed. Though initial germination per unit area did not vary under the various media, seedlings grown on shola soil were characterised by maximum dry matter production and shoot length.

The distinctly low root/shoot ratio on the shola soil medium was a reflection of its nutritive richness and moisture retentive capacity. Seedlings grown on sand had a high root/shoot ratio. The superiority of the seedlings rasied on shola soil was evident even after their transfer to containers Plant height and base diameter were markedly more in them. Photosynthetic surface as measured by the number of leaves, however, did not vary between the seedlings raised on the various media.

To determine differences between well-filled seeds and ill - filled seeds and if any, between seedlings obtained from these two categories of seeds, a study was conducted at the Forestry Research Station, Mettupalayam. Since sieving or winnowing yielded partial or no success, water-grading was adopted to separate the two grades of seeds. After separation they were sown separately to assess whether germination and seedlings vigour varied between them. Germination of ill-filled seeds was considerably low, being only about one third of that of well-filled seeds. Shoot length of seedlings obtained from ill filled seeds was also lesser than that of well-filled ones (Table 55). Their high root/shoot ratio was indicative of their debilitated cotyledons. Since initial growth vigour has a bearing on adult performance, this study underlines the importance of sowing only will-filled seeds as against the common practice of sowing the mixture.

TABLE 55. Germination and growth components of seedlings of *E. tereticornis* raised from well-filled and ill-filled seeds

Seed Grade	Germination (no/dm^2)	Root length (cm)	Shoot length (cm)	Root/shoot ratio	50 Seedlings dry wt. (mg)	Height (cm)	Dia. at base (cm)	No. of leaves/plant
Well-filled	175	3.38	3.39	1.06	452	19.3	0.17	18.7
Ill-filled	69	3.64	2.94	1.27	449	16.5	0.15	17.4
CD 5%	70	NS	0.40	0.14	NS	NS	NS	NS

One hundred and fifty day old seedlings of six species of *Eucalyptus* viz., *E. tereticornis*, *E. citriodora*, *E. alba*, *E. exserta*, *E. torelliana* and *E. intertexta* were evaluated at the Forestry Research Station, Mettupalayam for variations in physiological and morphological traits like dry matter production, leaf area, specific leaf weight, leaf number, leaf dimensions, plant height and base diameter. All the growth components in-

vestigated displayed significant difference among the species, *E. citriodora* and *E. exserta* were characterised by low DMP; the other four species were comparable in this growth component. The distribution of dry matter revealed that 60 per cent of the total production was relegated to the leaf and the remaining 40 per cent equally apportioned between stem and root. Leaf area was maximum in *E. tereticornis* and *E. torelliana* but leaf thickness (SLW) was distinctly more in *E. intertexta.*

The study brought out marked contrast in the leaf length/breadth ratio among the species. Though in all species the leaves were longer than broader, in *E. exserta* the length was more than sixteen times the breadth and in *E. intertexta,* more than five times; in the other species, the association ranged between 1.6 to 3.6 This attribute can be used as a key to identifying these six speeies. The species, *E. tereticornis* and *E. exserta* possessed the maximum plant height and base diameter. Though DMP exhibited positive association with diameter at the base, LA, SLW and leaf length, the highest correlation (0 92) was with diameter at the base. This growth trait also excelled in genetic parameters possessing high heritability (85.7 per cent), and GA (34 2 per cent). Since juvenile vigour bears a close parallel in tree crops with adult growth, this parameter viz., base diameter can be used as selection index in programmes for breeding for high biomass (Table 56).

TABLE 56. Total correlation coefficients between the different growth components

	LA	SLW	Leaves/ plant	Leaf length	Leaf breadth	Length/ breadth ratio	Plant height	DB
DMP	0.7[illegible]**	0.511**	-0.093	0.441*	0.298	-0.187	0.591**	0.923**
LA	1	-0.028	-0.272	0.378	0.263	-0.261	0.646**	0.833**
SLW		1	0.285	0.229	-0.385	0.123	0.056	0.292
Leaves/plant			1	0.564**	-0.793**	0.929	0 358	0.212
Leaf length				1	-0.274	0.685**	0.783*	0.447*
Leaf breadth					1	-0.731**	0.193	0.436**
Length/breadth ratio						1	0.360	0.243
Plant height							1	0.603**
Dia. at base								1

An assessment was made of the injury caused to seedlings grown in an unweeded environment. An unweeded regime for 30 days had a mutigating influence on all growth components studied, viz., plant height, diameter at base, leaf number and leaf size. Extension of the period to 60 days further depresped these attributes. The component most affected was leaf breadth which sustained a decrement of 31.8 and 37.4 per cent

respectively after 30 and 60 days of unweeded environment. The loss in plant height and base diameter was respectively 22.2 and 37.4 per cent. When the seedlings were not given weeding for 60 days, the corresponding value for leaf number was 23.2 per cent. These results emphasise the need for elimination of weeds in eucalyptus nursery.

The total number of weeds was 678/m² which comprised 19 plant species, of which *Eragrostis* sp: was the preponderant weed accounting for 44.8 per cenr of the total weed growth. This was followed by *Mariscus* sp. constituting 34.0 per cent.

Under PL. 480 scheme on tree improvement in *Eucalyptus tereticornis* worked at the Forestry Research Station, Mettupalayam variations in the progenies of nine plus trees obtained from Rajendram, Sethumadai and Arakku Valley were studied in 150 day old seedlings for five growth attributes.

The coefficient of variation for height varied from 16.8 per cent in DF. 260 to 45.0 per cent in DF. 41. The DF 41 has recorded high CV for base diameter and leaf length also. Because this plus tree offers wide genetic variation, inter progeny hybridization was contemplated. The progeny of DF/278 exhibitad least variation (13.7 per cent) in base diameter. The mean for this growth attribute was also maximum in this plus tree. Since earlier studies have revealed base diameter in seedlings and diameter at breast height in tree to be correlated with biomass production, the progenies of this candidate tree may be bulked and advanced for yield tests. Studies on floral biology in *E. tereticornis* were initiated as a prelude to taking up hybridization programme in *Eucalyptus tereticornis*. Anthesis was found to occur in the mornings between 11.30 a.m. and 1.00 p.m during Feb.-March. Generally the flowers were found to be protandrous. The stigma receptivity was observed based on the freshness of the same after emasculation. The freshness persisted for 3-4 days. The period from flowering to fruit formation was observed to entail 30 days. Initial evaluation revealed success in selfing to range between 13 to 45 per cent.

SEED TECHNOLOGY

1. Cereals

Paddy : Evaluation of seed quality relative to seed weight was made with eighteen cultivars. The results indicated that heavy seeds represented by those retained at the base of the column of the penumatic seed sorter and by those that sank at the bottom of the sodium chloride solution of a specific gravity of 1.13 would be of better quality than the ungraded and floaters. The heavier seeds possessed relatively higher germinability, rate of germination, and seedling vigour (Table 57).

2. **Pulses**

(i) **Blackgram :** In variety Co. 3, a trial was conducted to study the influence of leaving one plant and two plants per hill with a constant spacing of 20 x 15 cm between hills on 100 seed weight. The results indicated that at uniform spacing, leaving two plants per hill significantly reduced the 100-seed weight. Highly significant differences were observed among different size grades of seed. A positive association was also evident between size and weight of seed.

At Bhavanisagar, seed quality evaluation of variety Co. 3 under different irrigation frequencies viz., 4 cm irrigations at IW/CPE rated of 1.05, 0.90, 0.75 and 0.60 and 6 cm irrigation at IW/CPE ratio of 1.05, 0.90 and 0.75 was periodically done. The seeds were packed at 8 per cent moisture content in kraft paper bages and stored over silica gel in a storage cabinet. The initial germination ranged from 86 to 94 per cent.

The results of germination and vigour potentials of the seeds evaluated at initial month, 9 and 13 months of storage revealed a significant difference in germination potential of seed due to irrigation frequencies as well as periods. The vigour potential of seeds was not influenced by the irrigation frequencies but was, however, affected significantly by the period of storage.

3. **Oil Seeds**

(i) **Groundnut :** Pot-culture experiment was carried out in TMV 7 to determine the relationship between seed size and depth of sowing on seedling emergence and vigour. Seeds of four size grades, were sown separately at four depths namely, 10.0, 7.5, 5.0 and 2.5 cm. The rate of emergence of seedlings was fast in shallow sowing, while it was slow as the depth of sowing increased. Sowing at 10.0 cm had resulted in relatively poor emergence. The root length decreased with increase with depth of sowing, whereas the reverse was the case in respect to the hypocotyl length. Selecting of seeds retained in 16/64" size sieve and sowing them at 5 to 7.5 cm depth would result in vigorous seedling growth.

(ii) **Gingelly :** With a view to determine the suitability of dursban and dichloromethane in combination with different fungicides experiments were conducted with the seeds of gingelly (variety, TMV 3).

The germination and vigour of the seeds were significantly influenced by the treatment as well as by the period of storage. The results clearly indicated that dursban can combine well with the three fungicides namely, captan, thiram, difolation and benlate used for seed treatment for treating TMV 3 seeds. Dichloromethane also can be used as a solvent for preparing the chemical (Table 57).

TABLE 57. Influence of different fungicides on the germination percentage of gingelly

Treatment	Initial	Germination (per cent) 3rd month	12th month
Control	75	62	88
Water	71	75	84
Dichloromethane	95	86	82
Dursban in water	95	92	88
Dursban in dichloromethane	100	81	92
Dursban + Captan + Water	97	98	100
Dursban + Captan + Dichloromethane	100	99	94
Dursban + Thiram + Water	100	99	99
Dursban + Thiram + Dichloromethane	100	98	97
Dursban + Difolatan + Water	81	98	100
Dursban + Difolatan + Dichloromethane	100	100	98
Dursban + Bavistin + Water	85	94	90
Dursban + Bavistin + Dichloromethane	85	96	97
Dursban + Benlate + Water	95	98	84
Dursban + Benlate + Dichloromethane	97	100	99

	SEd	C.D. (P=0.05)
Treatment	4.049	8.098
Period	2.019	4.182
Period x Treatment	8.097	16.194

(iii) **Sunflower :** Seeds of sunflower E.C. 68414 were slurry treated with aqueous and dichloromethane solutions of dursban alone and in combination with captan, thiram, difolatan, bavistin and benlate, with a view to determine the suitability of dursban (an insecticide) and dichloromethane (a solvent) in combination with the fungicides for treating seeds to be stored. The untreated seeds and seeds treated with water and solutions of dichloromethane served as control.

The germination of seeds were significantly influenced by the treatment as well as the period of storage. The vigour of seeds was, however, not influenced by the treatments, but only by the period of storage. The performances of all treated and untreated seeds were on par. Seeds treated with dichloromethane solutions of insecticides and fungicides, in general, recorded relatively low germination. Thus, the study indicated the unsuitability of the dichloromethane as a solvent as well as most of the seed treatments given to the seeds.

4. Fibre Crops

Cotton : In MCU 9 cotton, seed quality with reference to time of flowering in a plant was studied by collecting sufficient number of bolls that developed during the early, middle and late flowering phases of the

crop (Fig. 1). The seeds from the bolls developed during early and middle flowering phases were superior in quality. Therefore kapas from bolls burst during the first 30 days may be earmarked for seed purposes.

Fuzzy and acid-delinted seeds of MCU 9, treated separately with captan, bavistin, difolatan, thiram, vitavax + thiram and bavistin at the rate of 2 g per kg of seeds and packed in cloth bag, paper aluminium foil polythene laminated pouches were taken to storage along with untreated control under ambient conditions. The stored seed samples were tested at tri-monthly intervals for germination and seedling vigour. The results indicated : (i) at the end of 24 months of storage the germination in the delinted seeds ranged from 84 to 89 per cent while in the fuzzy seeds from 71 to 64 among the treatments; (ii) after this period, the rate of decline in germination was more in the delinted seeds than in the fuzzy seeds, recording a germination of 24 and 39 per cent respectively at the end of 30 months of storage; (iii) on an average the seeds packed on P-AF-P pouches recorded 67 per cent germination after 27 months whereas those in cloth bags 57 per cent; (iv) at the end of 12 months of storage the untreated seeds recorded 69 per cent germination while the germination ranged between 73 and 77 among the treated seeds; (v) captan was superior to other chemicals for treating the seeds; (vi) fuzzy seeds treated witn captan and packed in cloth bags recorded 69 per cent germination after 2½ years of storage in P-AF-P pouches (Fig. 2).

5. Vegetables

(i) **Bhendi :** In a trial conducted to study the influence of different population density under uniform application of 40 kg N, 50 kg P_2O_5 and 30 kg K/ha revealed that sowing the seed at 45 x 15 cm spacing was optimum for recovering maximum quantity of quality seed (Table 58).

TABLE 58. Influence of population density of bhendi on seed weight and seed yields

Spacing (cm)	Mean number of Fruits/ plant	Seeds/ fruit	Mean wt. of seeds/ fruit (g)	Seed Yield (kg/ha)
60 x 15	6.3	48.7	4.7	1563
60 x 20	7.7	47.8	3.9	1753
60 x 30	7.7	50.4	4.7	1807
45 x 15	6.7	51.4	4.9	1824
45 x 20	7.8	43.9	4.9	1761
45 x 30	8.0	47.9	4.3	1345
30 x 15	7.7	46.3	4.8	1506
30 x 20	7.1	43.9	3.9	1180
30 x 30	11.4	46.0	3.8	1168
S.E.		4.8		2.5
C.D.		14.1		7.2

Foliar application of $ZnSo_4$ at 100 ppm, besides the basal application of 40 kg N, 50 kg P_2O_5 and 30 kg K_2O/ha at 10 day interval from the commencement of flowering resulted in 12.2 fruits per plant and a seed yield of 16.6 Q/ha as against 9.7 fruits/plant and 10.6 Q of seeds per hectare obtained from the crop not given the micronutrient treatment.

(ii) **Tomato :** In PKM 1 tomato, application of 150 kg N, 60 kg P_2O_5 and 50 kg K_2O/ha induced early flowering in 23.8 per cent of the population and early fruit set in 16.0 per cent of the population, whereas the crop that received only half of this level of N recorded early flowering and fruit set only upto 17.5 and 8.7 per cent, respectively.

(iii) **Brinjal :** In MDU 1 brinjal, application of 125 kg N, 40 kg P_2O_5 and 60 kg K_2O/ha induced early flowering in 44.5 per cent of the population and fruit set in 20.1 per cent of the population whereas the crop that received only half of this dosage of N recorded early flowering and fruit set only upto 26.5 and 7.6 per cent respectively.

(iv) **Chillies :** Application of 125 kg N, 25 kg P_2O_5 and 25 kg K_2O/ha in Co.1 Chillies induced early flowering in 56.5 per cent and early fruit set in 39.5 per cent of the population. The crop that received only half this dosage of N recorded early flowering and fruit set only upto 26.8 and 18.6 per cent, respectively.

(v) **Gourds :** Fruit and seed development and maturation studies carried out (i) in the variety LS_2 of bottlegourd (*Lagenaria ciceraria*) indicated that the seeds reach the harvestable maturity on 65th day after pollination, when the germination of seed was highest and the seedling vigour as measured through the seedling length and dry matter production was also at maximum (ii) in Co. 1 ribbed gourd (*Luffa acutangula*), the fruit attained the maximum length, volume and weight on the 42nd day after pollination; the seed attained physiological maturity on 60th day when the seed moisture content was 15.2 ± 5 per cent and (iii) in Co. 1 bittergourd (*Momoridica charantia*), the fruits attained the maximum length, weight and volume on 24th day after anthesis; the seed attained harvestable maturity on 30th day ween seed moisture content was 26 per cent.

Seed storage studies conducted in bottle gourd for a period of 12 months with seed samples treated separately with activated clay, baythion, bavistin, difolaton, sumithion and thiram and packed either in cloth bags or in paper-aluminium-polyethylene laminated pouches along with untreated check indicated that the seeds stored in P-AF-P laminated pouches recorded significantly higher germination and produced vigorous seedlings than that stored in cloth bag. Bavistin was found to be the best seed protectant in

maintaining the germination and vigour of the seeds in storage. Seeds stored in moisture-proof containers maintained the initial germination for a period of 12 months.

In Co. 1 ash gourd, a study was undertaken to find out the effect of maleic hydrazide applied at 400 ppm to foliage at two-and five-leaf stages, besides the soil application of N at levels ranging from 20 to 160 kg/ha on the number of female flowers produced and fruit yield. The results revealed that foliar application of 400 ppm of maleic hydrazide, besides soil application of 160 kg N/ha, resulted in the highest yield of fruits (Table 59).

TABLE 59. Influence of maleic hydrazide and nitrogen on number of flowers and fruit yield of Co. 1 ash gourd

Treatment	Number of female flowers	Fresh weight of fruits (Kg/plant)	Yield of fruits (Kg/ha)
Control	3	2.8	2,450
20 kg N+400 ppm MH	10	9.5	7,500
40 kg N+ ,,	12	15.5	13,000
80 kg N+ ,,	16	18.5	15,800
160 kg N+ ,,	30	31.5	26,000

In another experiment with the same variety, application of ethrel (2-chloroethyl phosphonic acid) at 200 ppm from first leaf stage till flowering and followed by the application of urea and super phosphate (16 hr soaking in water and taking the supernatent only) and potassium sulphate at 2.2 kg, 1.08 kg and 0.75 kg, respectively, with 250 ml of micronutrients in 100 l of water thrice at 10 - day interval commencing with the first flowering, besides the basal application of NPK at 40, 50 and 30 kg, respectively, increased the production of female flowers and fruit yield.

(vi) **Radish** : In the experiment to determine the best method of seed production in white and scarlet varieties, it was found that steckling the root tuber i.e., removing the bottom half of the root and chopping off of 2/3 portion of the leaf from apex, was the best method, as it forced more than 75 per cent of the population to flower uniformly when compared with the tubers left *in situ* for seed production. Among the different spacings tried, steckling the roots at 60 x 20 cm was found optimum.

(vii) **Amaranthus** : In the trial to study the influence of population density under the uniform application of 25 kg N, 50 kg P_2O_5 and 20 kg K_2O, a spacing of 30 x 30 cm was optimum for a seed crop of variety

Co. 2. The number of seed bearing branches was 25 2 in the crop supplied with 25 kg N and spaced at 30x20 cm. However, seed yield was maximum for plants spaced at 30x30 cm and applied with 25 kg N/ha.

6. **Forage legumes**

Lucerne: In Co. 1, the flowers that were likely to open the next day were tagged in required numbers and the developing pods from them were collected at 5 days interval commencing from 5th day after anthesis and tested for the pod and seed characters. The results indicated that (i) the moisture content of the pod which was 80 per cent on the 5th day decreased to 22 per cent on the 30th day (ii) the pod colour changed to yellow from green on the 25th day (iii) the pod to seed ratio at pod maturation stage ranged from 5.0 to 7.0 on dry weight basis and (iv) the seed moisture content on 10th, 30th and 60th day was 80 per cent 20 per cent and 13 per cent respectively. The developing seed started germinating from 20th day after anthesis and recorded 85 per cent germination on 30th day. If the pods were allowed to remain beyond this period, the pod colour changed from yellowish green to brown and the seed coat colour tended to become dark brown to brownish black. The percentage of dark brown seeds increased from 4.4 on the 40th day to 15.8 by 60th day. The seed with dark brown or brownish black seed coat was poor in quality.

7. **Green manure crops**

(i) **Sunnhemp**: In the variety 'Bapatla' the main shoot bore 1 pods on an average and the quality of the seeds with reference to position of the pod was as follows: (i) The bulk seed obtained from the pods could be graded into two sizes viz., 7/64" retained and 6/64" retained; the recovery per cent in 7/64" retained varied from 91.9 to 66.5 with a mean of 78.9, while in 6/64" retained from 32.5 to 5.8 with a mean of 20.9. The germination between these two grades was significant but the differences in germination due to position of pod and the interaction between grades and position of pod were not significant. The germination varied from 86 7 to 66.' and from 74.7 to 57.3 per cent in the 7/64" and 6 64" retained seed respectively.

(ii) **Daincha**: In a bulk crop, in 50 randomly marked plants critical study on the attributes associated with yield and quality of seed indicated the following: The mean number of pods harvested per plant was 40,5 while it varied from 4.5 to 13.5 among the pickings. Maximum number of pods (24 per plant) was harvested in the third picking while the minimum during the last harvest. The range was maximum in the third picking

while it was minimum during the fourth picking. A total of five picking could be had from the first flush of the crop. The mean length of pod was 19 6 cm for the plant as a whole while it varied from 17.9 to 21 4 among the picking. The range in length was maximum in the 4th picking.

The pods from the remaining plants of the bulk crop were harvested immediately after harvesting the pods from the marked plants and the seeds were extracted after sun-drying them for two days. After cleaning, the bulk seed was dried to reduce the seed moisture content to a constant level and size graded with a sieve having 7/64" round perforation.

It was observed that both germination and seedling vigour was significantly higher with 7/64" retained seeds than in 7/64" passed. And also, seed from the first three pickings was superior in quality than that from the last two.

CENTRE FOR ADVANCED STUDIES

A. Centre for Agricultural and Rural Development Studies

(i) **Cost of cultivation of crops :** The Government of India scheme on Cost of Cultivation of Principal Crops in Tamil Nadu covered paddy, groundnut, sugercane and cotton crops during the year Data collected for paddy during 1977-78 were analysed and results indicated an average yield of 32 24 quintals per hectare, with wide interzonal differences ranging from 26.46 quintals in Chingleput to 44.89 quintals in Coimbatore Overall cost per hectare was Rs.3,122.42 for the state; it was lowest at Rs. 2200.62 for Chingleput and highest for Thanjavur and Madurai at Rs. 4,231,61. It worked out to Rs.81.57 per quintal for the State. It varied from 70.67 per quintal in Thanjavur to Rs.100.02 per quintal in Coimbatore Operational costs and fixed costs formed 62.8 per cent and 37.2 per cent of total cost respectively. Human labour and rent were the major components in variable and fixed cost respectively.

(ii) **Economics of irrigation :** An economic appraisal of Parambikulam Aliyar Project indicated wide disparities between potential and actual capacities, planned and actual, cropping pattern by wet and dry classification, and between planned and realized duty of water.

With the extension of the ayacut the uncertainty in water supply has tended to increase. With a five per cent interest rate, the benefit cost ratio for the project worked out to 0.76, 1 93 and 1.32 respectively for original estimates, estimates allowing for escalation in prices and that after extension of ayacut.

(iii) **Consumption behaviour of farmholds :** A study on consumption behaviour of farm households in Nilgiris District indicated that about 25

per cent of farm households or 30.96 per cent of farm population were below poverty line, with regional differences within the district. Total consumption expenditure was Rs. 5,981.13 per household per annum., of which 66 per cent went to food. Of the expenditure on food, 56 per cent was on cereals; the rice alone accounting for 45 per cent. Among non-food expenditures, clothing took the major share, followed by social and religious expenditure. Among the farm families, there was no disparity in consumption expenditure.

(iv) **Economics of broiler production:** Profitability of broiler production in and around Coimbatore city was studied. The average cost of establishing a poultry unit (20' x 10'x10') was Rs. 4000/- to accommodate 200 birds. Cost of production of poultry meat (live weight) was Rs. 8.10 per kg. With an average price of Rs. 9 per kg, it earned a profit of about Re. 0.90/ kg. If only the variable cost was considered the profit was Rs. 1.19/ kg. Therefore, broiler production is a profitable enterprise.

(v) **Relationship between wage income and level of living:** Another study focussed on the levels of living and wage income of farm labourers in Nilgiris district. Average size of labour family was 5.39 and 52.68 per cent of the members were employed. On an average, men were employed for 224 days in a year and women for 272 days. One of the unique features in Nilgiris was that women labourers were more intensively employed than men labour. This is because most of cultivation operations were performed by women. There was wide spread unemployment, with an estimated labour surplus of 37.99 per cent of the total supply. On an average, income per household was Rs. 3076.02 of which 87.99 per cent was received from agriculture; 8.14 per cent from livestock and the rest from other sources and that implied a heavy pressure on farm land. Development of agro-indusrries specific to hill areas might relax this burden.

(vi) **Economics of pisiculture:** Economics of inland pisciculture in farms was another area of study. It covered 31 farms in Thanjavur District. Size of fish farm varied from 0.20 ha to 2.57 ha., the average being 0.99 ha. Most of the tanks are government owned and the users take them on long lease for rent of about Rs. 380 per tank per year, the range being Rs. 49 to Rs. 2305 depending on the size of the tanks. *Saar* was the only equipment used by the fish farmer besides the net. There are two types of tanks-perennial and annual. In the former fishing is done periodically throughout the year, while in the latter it is done only in the summer. Rearing fish provides additional employment to the farmers to the extent of about 85 mandays in a year; 25 mandays are spent for maintaining the tank, 27 mandays for rearing. 38 mandays for harvesting and 5 mandays in selling the catch. Catla, Rohu, Bangkok, strain L. Fimbriatios, L. Cal Basu and L. Mrigala are the economic varieties recommended by the Department of Fisheries

and they are commonly reared. Harvesting may be complete or partial, the latter is being more common followed by 80.65 per cent sample farmers. Average income from pisciculture was Rs. 1226 per year. On an average, 45. 16 per cent of the catch was sold at the tank site itself, 25 per cent reaches urban markets and the rest goes to village treaders. Farmers' family consumes about 5 kg fish in a month. It is estimated that the consumption of fish substitutes other non-vegetarian and vegetarian dishes to the extent of Rs. 3.29 and Rs. 11.06 respectively. Cost of production per kg of fish was Rs. 3 56, and the revenue was Rs. 4.10, leaving a net profit of Re. 0 54 per kg. Supply of nylon nets, quality fingerlings and credit for construction and repair of tanks are the facilities required. At present marketing appears not to be a serious problem in fish but further expansion of pisciculture is found to bring in the problems of marketing.

(vii) **Studies on farm credit** : Efficiency in use of farm credit was studied in respect of short term cultivation loans. Efficiency was measured by the profit ratio and the results indicated that farmers used credit efficiently. Only in 13 per cent of cases farmers could not use the credit efficiently because they were received late. Cultivation loans were self liquidating, but there were defaults in repayment to the extent of 33.41 per cent. It was found that high cost private loans are discharged on a priority basis over subsidised co-operative credit. This was observed to be a rational action to minimize total cost of credit. Private money lenders are flexible in recovery of loans, but farmers desire to clear them early. Institutional agencies insist on prompt repayment, but farmers delay it One reason for this paradox is the difference in the cost of credit. Another interesting finding in that farmers are conscious of the cost of credit while repaying the loans, but they seem to be indifferent to the cost at the time of borrowing in their desperate effort to secure enough finance to meet their demands fully. It would seem a reflection on the inadequancy in the flow of institutional credit.

The result has an important policy implication. A suggested policy is to make institutional credit as nearly costly as private credit but liberally permitting flexibility in the procedural formalities and insisting on prompt repayment, but to reward promptness with an attractive subsidy on interest collected, at the time of collection. This policy may prove beneficial both to the financing institutions and the borrowing farmers in the long run.

(viii) **Studies on marketing of vegetables** : The study on tomato indicated wide fluctuations in yield from one quintal per acre to 35 quintals; the reason was excessive rain during November 1979. The price of tomato varied from Rs. 45 to 250 per quintal. Farmers recived only 50 per cent of the price paid by the consumers. A minimum price of Re. 0.60 per kg

in the summer and Rs. 1.20 per kg in the rainy season would be acceptable to the farmers. They wanted establishment of assembling centres within 4 to 5 kms. The commission charge of 10 per cent of value of the produce is high and musr be reduced. Improvement in market intelligence services will benefit the farmers.

Ad-hoc studies carried out in production and marketing of onions and tomato indicated that average yield of small onion during 1979 was 44.36 quantital per acre against the normal yield of 70 quantals, due to adverse weather conditions and poor quality of seeds. Farmers were handicaped on account of loss in quality due to bad weather, storage problems, poor bargaining power in the market and lack of information on market trends in prices and received very low prices. Producers received only ?6 per cent of what consumer's paid. A multidisciplinary research effort to stabilize onion yield, evolving of low cost small scale storage technology and improvement in market facilities were suggested.

(ix) **Cropping pattern in relation to rainfall :** To study the impact of increased water table, due to heavy rainfall received during 1979, on cropping pattern, a study was taken up in Coimbatore district. Coimbatore district like other parts of the State, received an annual rainfall of 1295 mm in 1979, with a heavy concentration in October and November months. The water table has fluctuated 20-30 meters in the wells, while the normal fluctuation was about 5-10 meters. However, the decision options of the farmers with abundant water supply were different from what has been generally anticipated. Farmers who had already assured water supply in the wells did not expect any sudden change and farmers whose wells commandability was below 50 per cent of the operational area prior to the recent rains, preferred to go for less water consuming crops like maize, tapioca, cholam, ragi, vegetables etc. inspite of the abundant supply of water in the wells. The major constraints were the non-availability of labour and timely credit. Also most farmers preferred easy management of the crop operations. Finally, this study suggested the need for ensuring supply of good quality seeds and institutional financing to purchase the inputs, energising the once abandoned wells for future irrigation and to repair the damaged wells and pumpsets in the heavy rain. It is also suggested to resort planting of perennial tree crops and export the production surpluses to other States.

(x) **Impact of farm credit on farming :** A study conducted in 40 farms financed by four Land Development Banks in Madurai District revealed that there has been perceptible changes in production pattern, income and employment as a result of long term finance. About 70 per cent of the advances made by the Land Development Banks were towards minor irrigation. On an average, the cropping intensity in general had increased from 146.24

per cent to 161.42 per cent for the entire sample. The income as a result of investments showed an increase of Rs. 3755 per farm and Rs. 1076 per acre. In addition, there has been 63 per cent increase in mandays employed in the farms. The study emphasized the need for increased short term credit facilities to exploit fully the benefits of long term investments.

(xi) **Studies on mixed farming :** A study on the economics of mixed farming in 150 farm holdings around Madurai revealed that inclusion of dairy animals in farms helped in augmenting farm income. The income from dairy animals ranged from three per cent to 32 per cent of the total farm income. The cross bred cows gave higher milk yield at lower cost of production. On an average, a cross bred gave 1339 litres of milk as against 1011 litres of milk obtained from a local non descripts. Similarly the cost of production of milk per litre was less in the case of cross bred cow with Rs. 0.89 while it was Rs. 1.03 in local cows.

(xii) **Assessment of extension methods :** An inter-disciplinary study on the efficient assessment of credibility of extension methods and media relevant to socio-economic groups and patterns of farming revealed that farmers in the districts of Coimbatore, Salem and Dharmapuri prefer to have the agricultural information received from personal sources such as village level worker, Deputy Agri. Officer, neighbours and friends rather from impersonal sources. Radio seems to have been utilised most by Dharmapuri farmers and Coimbatore extension workers. Use of slides by the extension workers is of in high order both in Coimbatore and Salem districts while displaying hoardings have been followed by Salem and Dharmapuri district extension workers.

(xiii) **Farm broadcasts :** Another study of Farm broadcasts in relation to small farmers revealed that nearly three fourths of small farmers were listeners of farm broadcast and only one fourth of them were non-listeners. Regarding frequency of listening, nearly equal percentage of small farmer listeners were found under regular and occasional listener categories. Three fourths of the listeners did not have their own radio sets. Only one fourth of the listeners owned their own radio sets Majority of the regular listeners used their own radio sets whereas majority of the occasional listeners used community sets. Rare listeners used others sets. In a study on the potential of village school teachers as effective "influentials" in the adoption of innovations, it was found that nearly more than half of the teachers were farmer teachers and they were listening to the farm broadcast "sometimes". The farmer-teachers were found to view agricultural films screened in villages, attended "Karuthukatchi" and used demonstration plot. They were also found to give farm information on seed, fertilizers and plant protection chemicals to farmer friends, relatives. neighbours and fellow teachers. The two main sonrces of information utilised by teachers were ratio and gramasevak These sources may be made to be effectively used.

(xiv) **Correspondence course :** In a diagnostic study of participants of Correspondence course for farmers, it was found that most of the participants got first information-about the correspondence course through newspaper and radio. Most of the participants are joining the course to know the package of in full and clearly and adopt the same. Regarding the liasion function perpractices formed by the participants, they reported that they induced other farmers to join the course. They also reported to have adopted the new agricultural practices and informed others that their adoption was due to their joining in the correspondence course.

(xv) **National Demonstration programme :** A study of impact of National Demonstration programme on the nature of diffusion of farm innovations and the socio-economic changes of the farmers in the demonstrated and non-demonstrated villages has shown that the awareness and adoption of recommended practices were quick and high in the demonstrated village when compared to the non-demonstrated village. In the demonstrated village, block agencies, neighbours and radio were the most preferred sources of information in the order and in the non-demonstrated village the most preferred sources were neighbours, block agencies and commercial agencies in the order. Hence, it is suggested that while conducting demonstration in a village, neighbouring farmers in the village and the block agencies should be involved so as to effect quick diffusion of agricultural technology among more farmers in the village.

(B) AGRICULTURAL MICROBIOLOGY

1. Symbiotic nitrogen fixation

(i) **Survey for nodulation of different crops and isolation of rhizobial strains :** Survey for nodulation in redgram, blackgram, greengram, cowpea, lablab, bengalgram and horsegram was carried out at 172 locations in Tamil Nadu. From redgram 28 rhizobial isolates, blackgram 29 isolates, greengram 19, cowpea 12, lablab 4, bengalgram 17 and horsegram [illegible] isolates were made from the crops surveyed at the above locations.

(ii) **Screening of rhizobial strains :** Out of the 15 redgram rhizobial strains screened under field conditions, CC 1 CC 2, Avinashi 3 and Vijayamangalam 3 produced more number of nodules per plant. Similarly, of the sixteen rhizobial strains isolated from blackgram, only 4 strains showed maximum nodulation, dry weight of nodules and nitrogenase activity. In respect of greengram rhizobial isolates, GMBS-1, Tekkalur 1 and KKRI. G G.I. performed better in producing nodules, nodule dry weight and nitrogenase activity when compared to the rest 12 isolates. Among the 30 rhizobial isolates from bengalgram, eight rhizobial isolates, recorded maximum nodule number, nodule dry weight, plant dry weight and grain yield under field conditions.

(iii) **Interaction between rhizobial strains and cultivars of pulses :** Five redgram rhizobial strains were tested for their efficiency to produce nodules in two varieties of redgram (T21 and Co. 3) under field conditions. Inoculation with rhizobial strains significantly enhanced the nodulation. Maximum grain yield was obtained in both the varieties inoculated with Coimbatore strain.

When two cultivars of blackgram viz., T9 and Co. 4 were inoculated with four rhizobial strains there was an increase in nodulation pattern, nodule dry weight under field conditions. Among the rhizobial cultures, better grain yield was recorded with BMBS P. 47 in both the varieties followed by Badanpur strain. The increase in grain yield in T9 ranged from 5.3 to 18.6 per cent while in Co. 4 it ranged from 8 2 to 14.6 per cent. Results on the multistrain inoculation on blackgram (variety Co. 4) conducted at Kumaraperumal Farm Science Centre, Trichy and in a farmer's holding at Udumalpet revealed that due to inoculation with multistrain there was an increase in grain yield ranging from 29 6 to 36.3 per cent over uninoculated control.

Results on interaction between two cultivars of cowpea (Co. 152 and Co. 2) and four strains of Rhizobium (CMBS-1, TAL 1309, DC 6, USAB 125) revealed that CMBS-1 strain gave maximum grain yield followed by DC 6 in both the varieties of cowpea. The increase in yield ranged from 17.1 to 24.2 per cent in C. 152 variety, while it ranged from 4.5 to 16.3 per cent in Co. 2 variety over the uninoculated control.

Field experiments conducted to know the effect of interaction between four cultivars of bengalgram and different rhizobial isolates revealed that multistrain inoculation enhanced the grain yield by 15.3 to 44 6 per cent. Among the four varieties tested, Co. 1 variety gave maximum grain yield of 0.57 kg/plot which amounted to 712 kg/ha followed by Annegiri, H 208 and BG 208 with a yield of 625, 637.5 and 591.3 kg/ha. respectively (Table 60).

TABLE 60 Interaction between cultivars of bengalgram and strains of rhizobia

	Grain yield (Kg/ha)				
	Rhizobial strains				
Varieties	IARI	TNAU 1	ICRISAT	MULTISTRAIN	Control
Co. 1	606.3	631.3	563.8	712.5	493.8
Annegiri	582.3	612.5	541.3	625.0	481.3
H. 208	432.5	581.3	431.3	637.5	431.3
BG 203	525.0	562.5	518.8	591.3	512.5

(iv) **Screening of genotrpes of pulse crops :** Among 14 genotypes of cowpea examined, the genotypes Co 3, PLS 35 and T 1181 were found to produce more number of nodules, dry weight and grain yield. Similarly of the nine genotypes screened in blackgram, four produced maximum nodules and they were identified as highly responsive cultivars. Bengalgram genotypes RAU 54, BG 220, BDN 9-3 and RAU 52 responded well in terms of nodule number, nodule weight, dry matter yield and seed production to the native rhizobia. Among 34 IET varieties screened for their response to inoculation, BDN 9-3, JG 1261, BG 406, BG 239 and BG 404 gave better response in nodulation, nodule dry weight and grain yield.

(v) **Azolla - anabaena syetem symbiosis :** Experiments conducted at Coimbatore and Aduthurai to study the efficiency of *Azolla* fertilization revealed that the incorporation of *Azolla* along with the recommended dose of nitrogenous fertilizers accounted for an additional yield of 3 to 6 quintals of grain per hectare (a grain yield of 5.5 t/ha at Coimbatore (TNAU 4372) and 4.9 t/ha at Aduthurai (NLR 9672) as compared to 5.2/ha and 4.3 t/ha respectively for the control (N fertilizer alone).

2. **Non-Symbiotic nitrogen fixation**

(i) **Inoculation of free living nitrogen fixing organism on rice :** A field trial conducted at Paddy Breeding Station to know the effect of combined inoculation of *Azotobactor*, *Azospirillum* and blue-green algae on rice variety TNAU 4372 indicated that combination of *Azotobacter* and blue-green algae was more effective at 75% N level which amounted to 11 per cent increased grain yield (5495 kg/ha) than the uninoculated control supplied with 100% N alone (4907 kg/ha).

Field trials conducted at Coimbatore and Aliyarnagar with blue-green algae inoculation along with graded levels of fertilizer N in Co 42 rice variety revealed that blue-green algal application with 75 per cent and 50 per cent recommended gave equal or slightly higher yield (7115 kg/ha-75%) and 6802 kg/ha (50% N) than that of uninoculated control supplied with 100% N alone (6702 kg/ha) indicating a possible saving of 25 - 50% of fertilizar N. Similar results were also observed with Co 37 variety.

(ii) **Associate symbiosis by Azospirillum :** Studies made on the occurence of the associative symbiont, *Azospirillum* in different soil types of Tamil Nadu revealed that this organism was invariably present in all soils examined. Pure cultures of *Azospirillum* were isolated from different plant species. The nitrogen fixing capacities of these cultures, assayed by gas chromatography, ranged from 10-85 n moles of C_2H_4/culture/hr. Seed inoculation of sorghum (variety CSH 5 and Co 24) revealed increased dry matter production and plant growth. The seedling vigour of sorghum, maize, sunflower, bhendi, cotton and rice enhanced due to inoculation with *Azospirillum*.

Studies made on the colonization of *Azospirillum* revealed that the rhizosphere soil and inner rhizoplane harboured more population than rhizoplane, At flowering stage of the crop the population of *Azospirillum* was more. Exogenously supplied carbon sources like malic acid, succinic acid, glucose and bicarbonate to excised root bits of sorghum increased the nitrogenase activity. Field studies conducted with the sorghum variety CSH 5 and cumbu variety Co 6 revealed that soil inoculation and seed inoculation with *Azospirillum* resulted in increased grain yield dry matter production. The results further revealed that with 75 per cent of recommended nitrogenous fertilizer with *Azospirillum* was as good as using 100 per cent fertilizer N.

Germplasm collections of different Amaranthus species numbering about 80 were screened for the nitrogen fixation in the rhizosphere soil sample on 30th and 45th day after sowing. The results indicated maximum activity on 30th day. Among the different varieties screened *A. gangeticus* exhibited highest activity. The variety A 25 and A 27 showed maximum nitrogenase activity of 18.1 and 12.4 n moles of C_2H_4 produced/gram of rhizosphere soil, respectively.

3. Mycorrhizal Studies

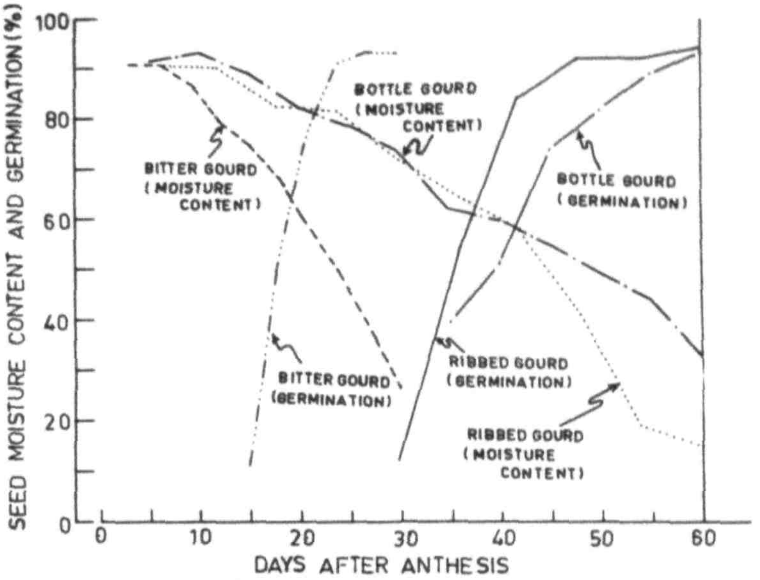
Cultivated field soils in TNAU campus were examined for the occurence of vesicular arbuscular (VA) mycorrhizal fungus. The field soils frequently applied with large amount of superphosphate did not harbour any VA mycorrhizal fungi and only the soils cultivated with low amount of superphosphate and continuously cultivated with monocropping harboured mycorrhizal fungus. In the monoculture soil of TNAU campus, wherein groundnut was continuosly cultivated, the occurrence of VA mycorrhizal fungus viz., *Glomus* sp was found to prevail.

4. Microbial Genetics

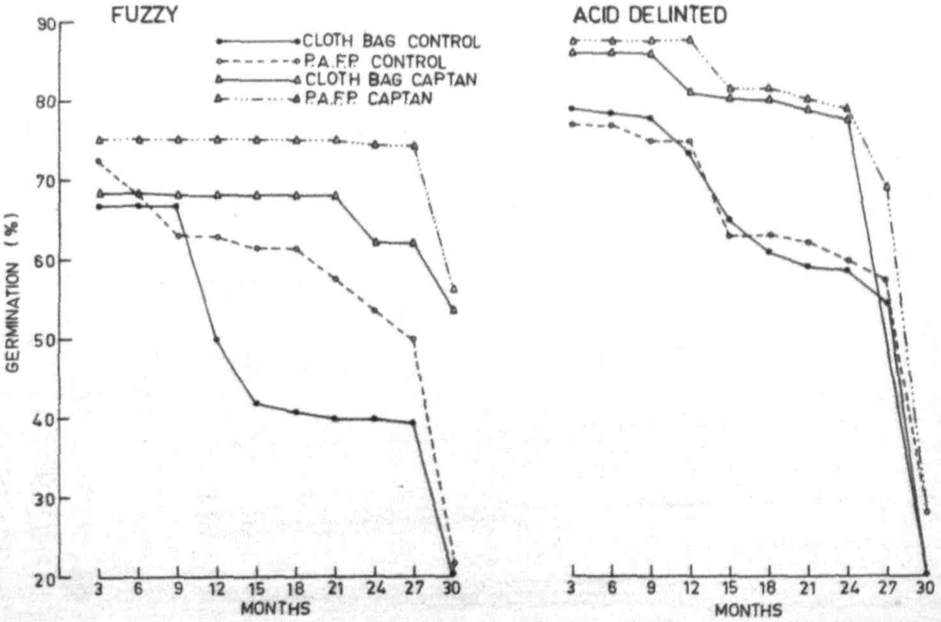
The physical characteristics of antibiotic resistant and pesticide resistant mutants of *Rhizobium* sp were studied *in vitro* and compared with wild type. Although wide variations were observed between the mutants and wild type with regard to polysaccharide production, respiration and IAA synthesis the mutant behaved normally like that of wild type in infecting and nodulating the cowpea plants.

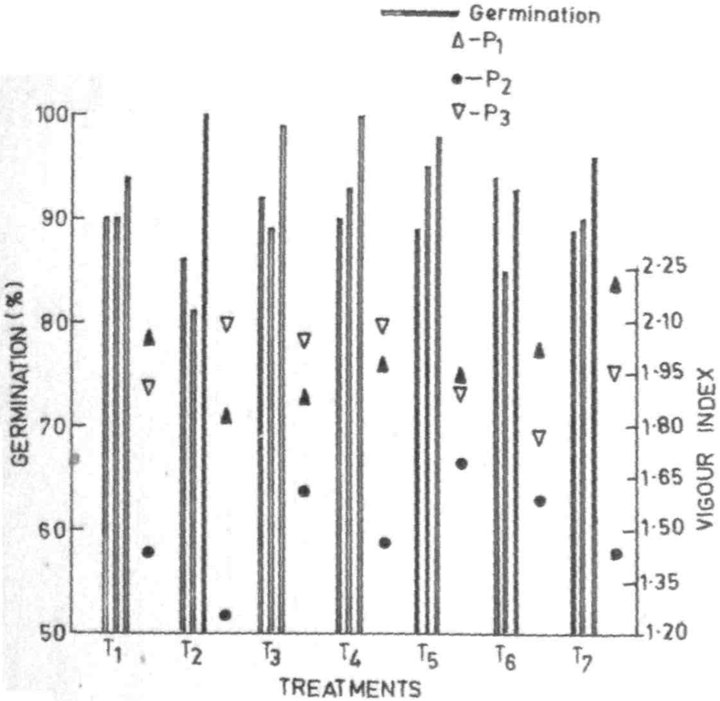
The results on the influence of different carbon sources on the growth and N_2 fixing efficiency of *Azospirillum lipoferum* revealed that malic acid supported maximum growth and nitrogen fixation of the organism followed by sorbitol. The pattern of synthesis of ammonia assimilatory enzymes in different nitrogenaseless mutants defective either in component I or II were same as that of the wild type indicating that the genes involved in nitrogenase synthesis and ammonia assimilation were detached from each other.

SEED MOISTURE CONTENT AND GERMINATION IN BOTTLEGOURD BITTERGOURD AND RIBBEDGOURD DURING DEVELOPMENT AND MATURATION OF SEEDS



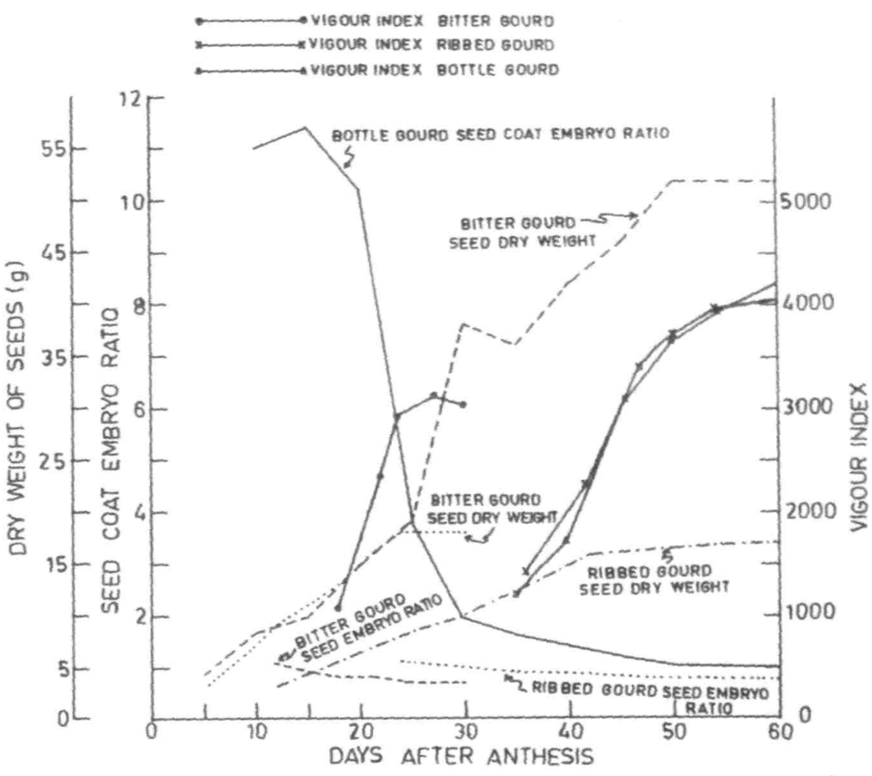
INFLUENCE OF FUNGICIDES AND CONTAINERS ON THE STORABILITY OF FUZZY AND DELINTED SEEDS OF MCU 9



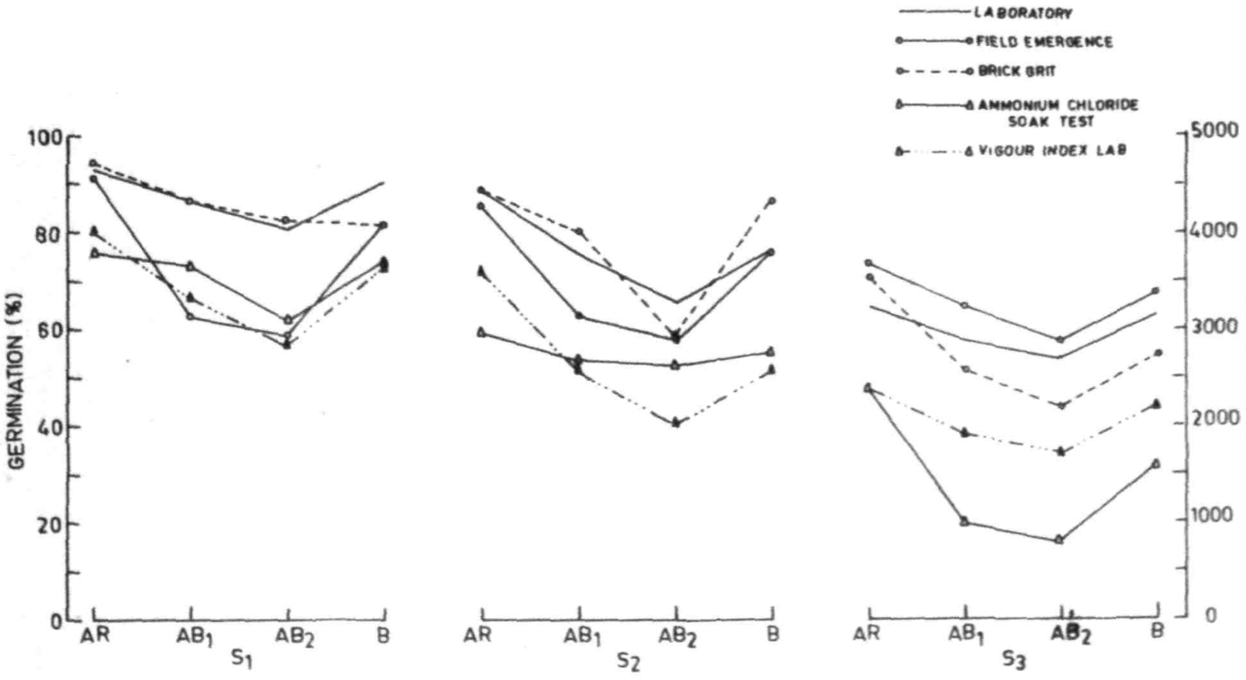


INFLUENCE OF SOIL MOISTURE ON THE GERMINATION AND SEEDLING VIGOUR OF Co_3 BLACKGRAM SEED IN STORAGE

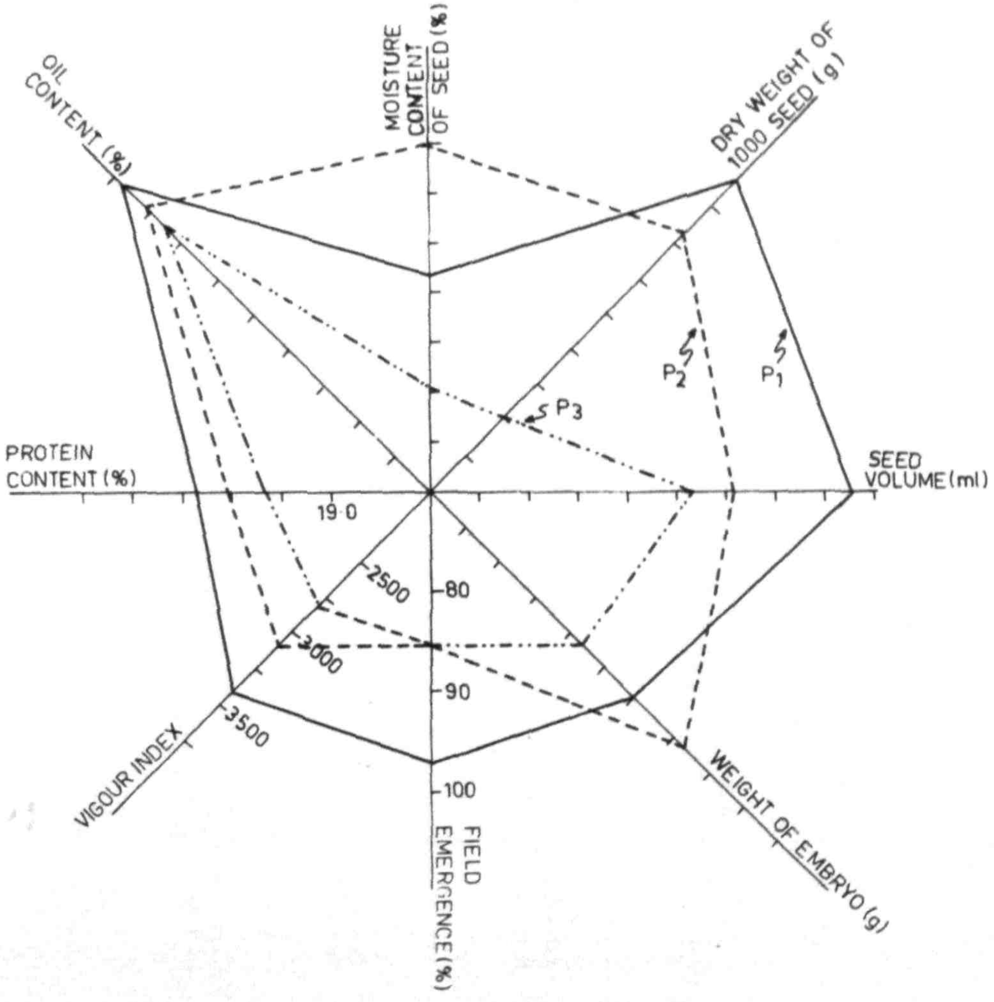
SEED COAT EMBRYO RATIO DRY WEIGHT OF SEED AND VIGOUR INDEX IN BOTTLE GOURD BITTER GOURD AND RIBBED GOURD DURING DEVELOPMENT AND MATURATION OF SEEDS



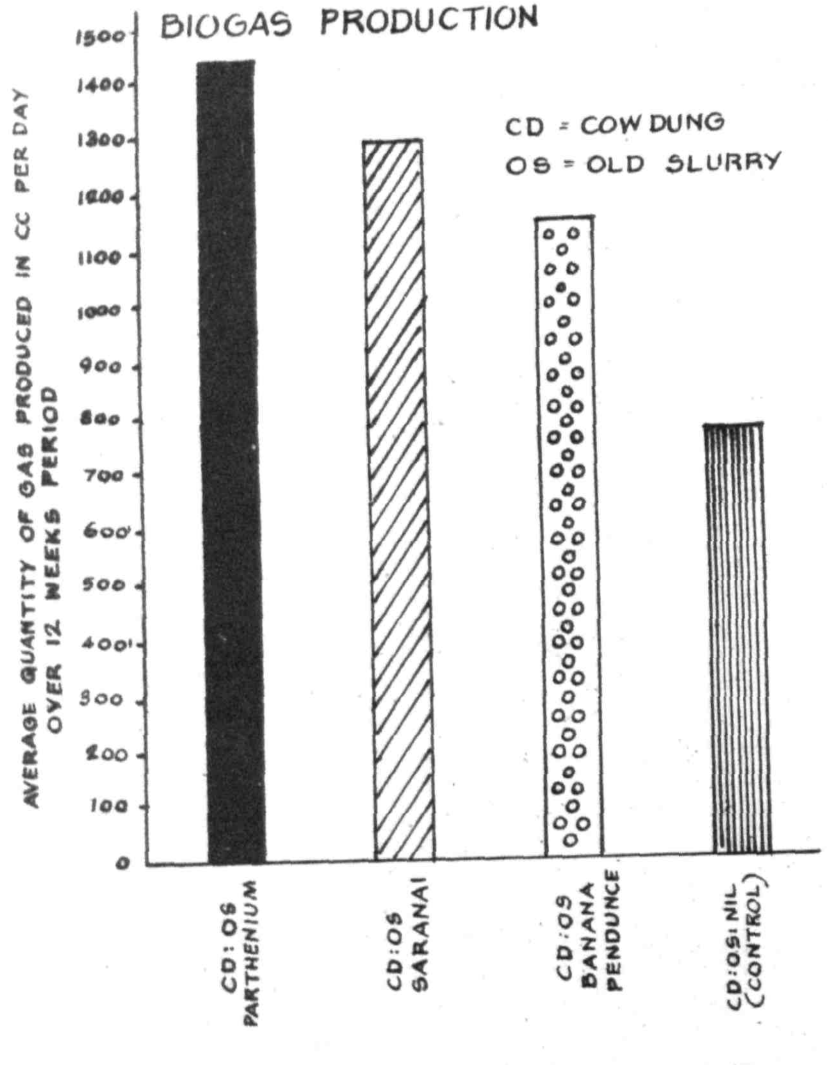
INFLUENCE OF SIZE AND WEIGHT OF SEEDS ON GERMINATION AND VIGOUR IN BOTTLE GOURD



SEED QUALITY AS INFLUENCED BY TIME OF FLOWERING IN MCU 9 COTTON



EFFECT OF INCORPORATION OF VARIOUS MATERIALS IN RELATION TO BIOGAS PRODUCTION



5. Biogas Technology

The effect of incorporation of chopped materials of parthenium, saranai and banana peduncle along wirh cowdung and old slurry in the propcrtion of 1;4:1 (v/v) respectively, was studied in relation to gas generation under normal room temperature, over a period of 12 weeks. The parthenium incorporated treatment gave a maximum gas generation of 1442 cc/day followed by saranai of 1294 cc/day. The control (cow dung+old slurry alone) however, recorded only 711 cc/day.

6. Recycling of Organic Matter

Soil samples from fields where conventional tillage, zero tillage and zero tillage plots incorporated with various mulches like cumbu straw, maize cob. ragi straw and sunflower stalk were collected and populations of bacteria, fungi, actinomycetes and *Azotobacter* were enumerated at the time of sowing and at the time of harvest. There was not much difference in bacterial population between sowing and harvest time especially in treatmants like conventional tillage, and no tillage plots covered with mulches like finger millet straw and sunflower stalk. At the time of sowing conventional tillage plot had highest bacterial population whereas at harvest no tillage plot covered with maize cob had the maximum population. Fungal population was more in no tillage plot covered with sunflowers stalk both at sowing and harvest. There was not much difference in the actinomycete and *Azotobacter* population between tillage and no tillage plot. Sunflower stalk and finger millet straw favoured actinomycete and *Azotobacter* population respectively.

In tapioca, the zero tillage plot was covered with maize cob, paddy straw, pearl millet stalk. banana pseudostem and groundnut shell. The bacterial population was more in conventional tillage and minimum in zero-tillage. Among the various mulches groundnut shell increased the bacterial population. The fungal population was also more in conventional tillage than other treatments. The fungal population slightly decreased from planting to harvest in various treatments except in plot covered with paddy straw. The actinomycete and *Azotobacter* population was more in conventional tillage plot both at planting and harvest.

7. Environmental pollution

(i) **Cement dust pollution :** Studies on the incorporation of different organic amendments like paddy straw, farm yard manure, pig manure and poultry manure into the cement dust polluted soil resulted in the reduction of apparent density, absolute specific gravity and hydraulic conductivity. Water holding capacity, however, got enhanced in the cement dust polluted soil. Although the percentage of pore space decreased in the initial stage

of application of amendments it got increased, in general during the subsequent sampling period.

Incorporation of the above organic amendments significantly enhanced the *Azotobacter* population, although variations were observed in bacterial, actinomycete and fungal populations.

Assessment of the changes in phyllosphere microbial populations of cement dust polluted leaves of crop plants like maize, sorghum, brinjal, cotton, tomato and chillies revealed a significant reduction of bacteria, actinomycetes and *Azotobacter* in cement dust deposited leaves when compared to non-polluted normal healthy leaves. Fungal population, on the otherhand, god reduced numerically although the decrease was not significant.

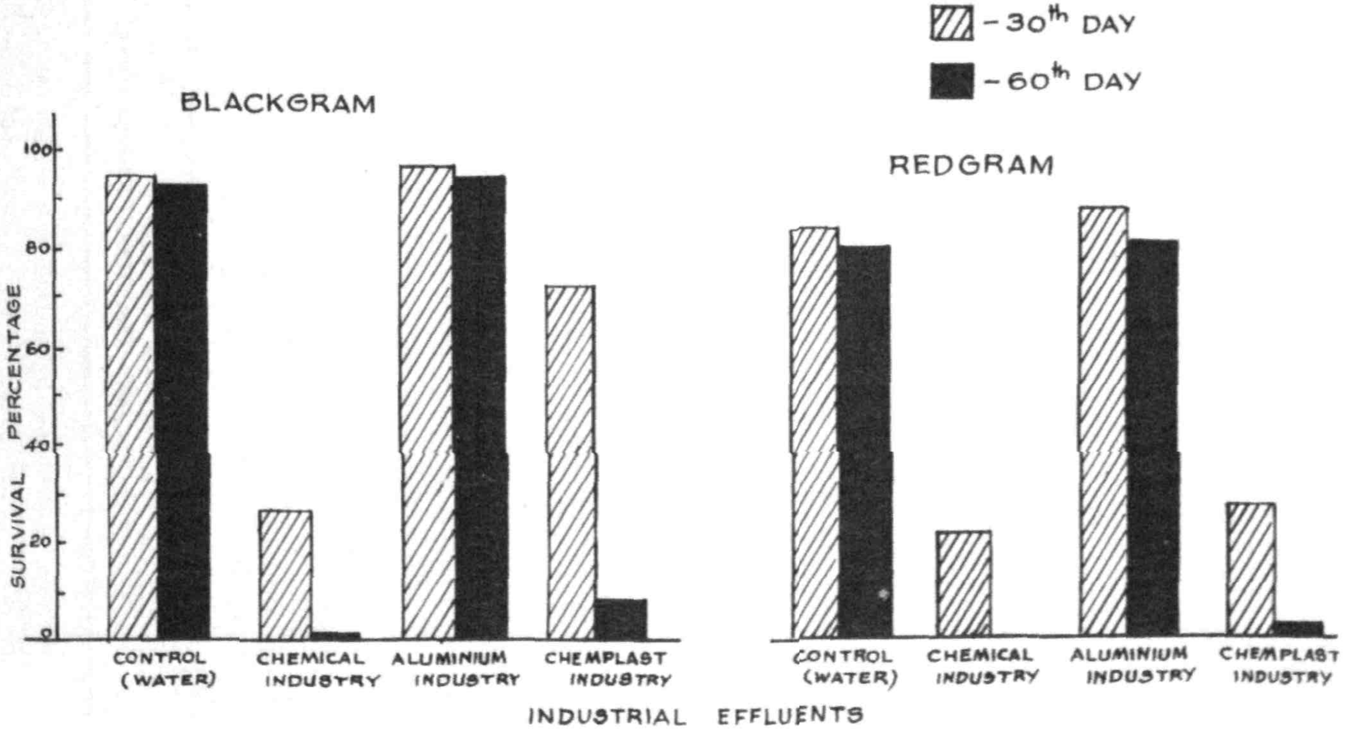
Studies on the effect of cement dust deposition on the nitrogenase activity of cowpea and redgram revealed a drastic reduction in the ethylene production; the reduction ranged from 33.4 to 85.8 per cent over control for shoot system, 29.0 to 90.4 per cent over control for root system and 34.0 to 85.5 per cent over control nodules.

(ii) **Pollution by industrial effluents :** Effluents from industries such as Chemical industry, Aluminium industry and Chemplast industry were collected and tested for their efficacy in promoting the growth of plant species. A maximum reduction in the vigour index of sorghum (54.1%) and cowpea (55.5%) seedlings was observed when treated with chemplast industry effluent while chemical industry effluent reduced that of greengram by 74.9 per cent. Aluminium industry effluent although decreased the vigour index of greengram and cowpea seedlings slightly, it enhanced the vigour index of sorghum seedlings.

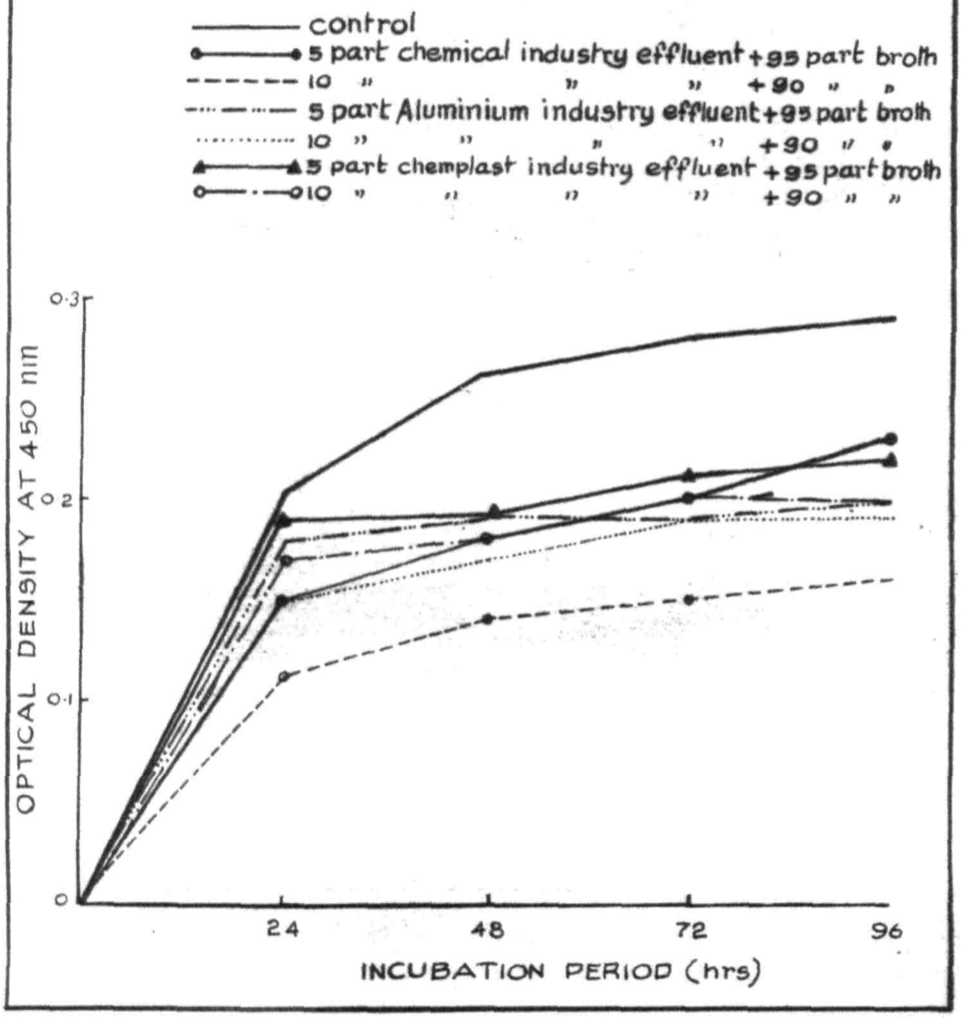
Studies on the effect of industrial effluents on soil microorganisms revealed a significant reduction in bacterial population in soil irrigated with different industrial effluents. The chemplast industry effluent enhanced the actinomycete population on 20th day, however, chemical industry effluent inhibited the actinomycete population in soil at two stages of sampling. There was a significant increase in soil fungal population on 20th day although chemplast effluent reduced the population on 40th day. A stimulation of *Azotobacter* in soil added with aluminium industry effluent on 20th day and 40th day was recorded, although chemical industry effluent had varying effect at two stages of sampling.

Experiments on the influence of diluted effluents on the *in vitro* growth of *Rhizobium* and *Azotobacter* revealed a reduction of both the organisms by the effluents of chemical, chemplast and aluminium industries at two dilutions; a greater inhibition in the growth of *Azotobacter* was observed particularly at higher concentration of chemical industry effluent.

EFFECT OF INDUSTRIAL EFFLUENTS ON THE GROWTH OF TWO PULSE CROPS



3 EFFECT OF INDUSTRIAL EFFLUENTS ON THE *in vitro* GROWTH OF *Rhizobium* sp.



The effect of industrial effluents on Single Cell Protein producing organisms like *Scenedesmus obliquus* was assessed. Effluents of the chemical, aluminium and chemplast industries were diluted to 50 per cent and the growth of alga estimated after 20 days inoculation. Interestingly, effluents from chemical and chemplast industries enhanced the growth of the alga.

Experiments were also conducted to establish the role of micro-organisms in the degradation of compounds of mercury present in the industrial effluent. Although *Aspergillus niger* and *A. flavus* were capable of degrading inorganic mercury, *A. flavus* was more efficient in the degradation process when the concentration of $Hgcl_2$ was at 25 ppm and *A. niger* when the concentration was at 50 ppm

Studies conducted on the treatment of effluents of sago factory by various methods revealed, that aeration for 5 hours reduced the odour, suspended solids, BOD and COD. When the effluent was filtered through a column of activated charcoal-sand (1:10 ratio) the suspended solids and odour of the effluent were completely removed. Similarly, filtiation with various adsorbents like cement, flyash, asbestos etc were found to reduce the harmful nature of the effluent.

The treated sago effluent generally increased the germination per cent and root and shoot length of crops when compared to raw effluent. Among the treatments the sand-charcoal column treatment showed maximum vigour n dex of different crops.

FORAGE CROPS

1. Grasses

(i) **Irrigated grasses :** New hybrids of Cumbu Napier *Pennisetum typhoides* x *P. purpureum* were synthesised by crossing 15 Cumbu varieties with 3 Napier types. Out of the 187 such hybrids advanced from initial evaluation trials 8 were selected for large scale yield tests. Among these hybrid XXIII/18 recorded the highest yield of 188 t/ha in 7 cuts whereas the control (NB 21)) yielded only 174 tonnes/ha. The best hybrids are being multiplied for district trials as well as in All India trials under the Co-ordinated programme.

An extensive crossing programme has been undertaken afresh with 8 different promising fodder type Cumbu varieties and 35 different Napier varieties. The hybrids from more than 240 different crosses are under evaluation.

In guinea grass narrow leaf mutants with a high leaf-stem ratio have been identified from the mutation studies and are presently under yield evaluation. In para grass one high yielding mutant has been identified.

In dinanath grass (*Pennisetum pedicellatum*), 44 desirable mutants have been selected on the basis of plant height, earliness, tillering and other desirable morphological characteristics for further evaluation in M4 generation.

(ii) **Rainfed grasses :** In Kolukattai grass (*Cenchrus* sp.) fifteen types were selected from the germplasm bank for yield trials. Out of these, the buffel type, FS. 391 recorded the maximum yield of 8 t/ha/cut. Dry seeds of FS. 391 were subjected to gamma irradiation and the M-1 progenies are under evaluation.

2. **Fodder Sorghum**

Eight selections being derivatives of different fodder sorghums crossed with *S. halepense* and other types were tested in a comparative yield trial along with CO.11 and CO. 21 as controls. Four varieties F. Sor.5, F. Sor. 6 F. Sor.1 and F. Sor.3 were the highest yielding with per day productivity ranging from 530 to 667 kg/ha while it was only about 490 kg/ha in the control (strain CO.11).

About 790 different families selected from F1, F2 and F3 populations of different cross combinations were under intensive evaluation and selection. Besides, 51 single plant derivatives of sweet sorghum x *S. halepense* crosses were also under test. From the mutation breeding studies of Co. 11 irradiated with gamma rays, 338 single plants have been advanced for further screening.

3. **Legumes**

(i) **Lucerne :** Twelve elite cultures (including selection FS 85. from Coimbatore) obtained from different parts of India were evaluated for their performance in replicated yield trial. Out of these culture FS.85 was the best, yielding 60.3 per cent more than the local check. Because of its consistent performance, giving better yield than local for the past three years, this culture was released as Co.1 during 1980.

(ii) **Other legumes :** In Cowpea (*Vigna sinensis*) 30 mutants and a germplasm collection of 247 varieties were under assessment for fodder potential. Nineteen varieties from germplasm and 394 mutant progenies of Horsegram (*Dolichos biflorus*) were evaluated and the best lines advanced for further testing. In Lab-lab (*Dolichos lablab*), 12 varieties and 8 seggregating lines from F2 population were assessed for forage potential.

Introduced leguminous fodder crops like *Dolichos axillaris*, *Stylosanthes scebra*, *Stylosanthes hamata*, *Desmodium tartosum*, Velvet Bean, *Centrosema pubescense*, *Glycine weightii*, Siratro etc., were evaluated under rainfed conditions and found to yield 6 to 7 t/ha/cut on an average.

4. **Mixed fodders**

Maize + Cowpea sown in alternate rows and harvested at flowering (55-60 days) was found to yield 193 t/ha/year in 5 crops which was better than Sorghum + Cowpea or Maize and Sorghum intercropped with velvet bean.

Among rainfed grass-legume mixtures, *Cenchrus + Clitoria* was the best yielding 7.6 t/ha/cut followed by *Cenchrus* + Siratro (7.1 t/ha). New combinations of Cenchrus and Dicanthium intercropped with *Desmodium, D. axillaris* and stylo hamata were under assessment.

5. Tree Fodders

Under irrigated conditions, tree fodders like Agathi, *Leucaena* and *Desmanthes* were evaluated for their fodder yield when raised to a spacing of 1 m x 20 cm. Desmanthus and *Leucaena* were found superior in the yield of green fodder with 44 t/ha/year, and 42 t/ha/year respectively. There was better regeneration in these two crops in the second year of establishment as compared to Agathi.

Five varieties of *Leucaena* were under comparative trials for assesment of fodder potential. Five different high yielding varieties have been obtained from Hawaii for evaluation.

FACULTY OF BASIC SCIENCES & HUMANITIES

The Faculty of Basic Sciences and Humanities consisted of the following departments : Biology, Biochemistry, Physical Sciences, Plant Physiology, Fisheries and Languages. In the Department of Biology studies on sericulture and tissue culture were in progress. In the Department of Biochemistry, the nutritive value of blackgram, keeping quality of sunflower oils and capsicin content of red and green chillies weredetermined. Standardisation of extraction and estimation of essential oil, effect of wastes and effluents from tannin industry on the ecosystem and utilization of pollutants were investigated by the staff of the Department of Physical Sciences. The Department of Plant Physiology has been concentrating its effort on testing cold tolerance in rice cultures, foliar fertilization in blackgram, greengram and groundnut and effect of topping and planofix on cotton. The Department of Fisheries was engaged in the study of fish and prawn culture under varied conditions, environmental and nutritional requirements of different fishes and designing cheap and simple Solar Drier for fish drying. In the Languages Department agricultural technical words in Tirunelveli District was studied.

BIOLOGY

(i) **Sericulture :** A multivoltine line with bivoltine character through hybridization work by using eggs of two races viz., Tamil Nadu White multivoltin race and U8 (biovoltin race) derived from gamma irradiation, has been evolved. Rearing of this particular line was continued upto three generations during the year. The larval and pupal characters of this new line and its parents are given in (Table 61.)

TABLE 61. Certain characters of parent and mutants of silk worm

Races	Larval length (cm.)	Larval weight (g)	Cocoon weight (g)	Shell (%)	Filament length (Meters)
U 7	5.6	2.80	1 600	16.1	901
T. W.	4.3	2.00	0.950	16.0	620
New Multi voltine	5.5	2.34	1.015	18.3	897

Erisilkworms were successfully reared on the artificial diet composed of tapioca leaf powder, agar agar, soyabean powder, sucrose, and distilled water The larval and cocoon characters of the erisilkworms reared on the artificial diet were similar to those reared on tapioca leaves.

(ii) **Tissue Culture**

(a) **Meristem tip culture** : A procedure has been developed for regenerating whole plants from shoot-tips and callus cultures of *Pogostomon cabbin* by *in vitro* methods. The callus tissues obtained from shoot-tips, differentiated into shootlings in Murashige and Skoog medium supplemented with kinetin (2 mg/l) or benzyl-adenine (0.5 mg-1mg/l) and incubated in growth chamber maintained at 25°C $\pm$ 2°C with a light (3000 lux) and dark cycle of 14/10 hr/day. The shootlings on transfer to White's liquid medium containing napthalene acetic acid (1 mg/l) developed profuse roots in 8 - 12 days. The planetlets were transferred to soil and grown upto maturity.

(b) **Anther culture** : For production of haploids in rice (*Oryza sativa*) anther culture was done in thirteen varieties of rice and hybrids. Two varieties 'Neera' and 'Chinidhan' developed callus in Blayde's medium.

(iii) **Studies on Azolla** : The effect of different fertilizers like urea, superphosphate and murate of potash was studied on the growth of *Azolla*. It was observed that nitrogen fertilizers did not favour the growth of *Azolla* and also inhibited its growth at higher doses.

BIOCHEMISTRY

(i) **Nutritive studies** : Nine varieties of blackgram samples were analysed for protein content. Among the 9 samples analysed, variety T9 had the highest protein content of 20 63. Among these 9 varieties, 4 varieties were subjected to protein fractionation and Globulins were found to constitute the major portion of the total protein and the prolamins form the least. Proximate analysis of 7 Yambean tuber samples was carried out. The protein content was found to range between 3 and 6 per cent and starch was found to range between 25 and 30 per cent.

Some of the ruling varieties of pulses were analysed for the protein and methionine contents. Winged beans were found to contain 23-25 percent protein content, whereas in the other pulses, namely bengalgram, blackgram, horsegram, greengram, lab-lab and cowpea, the protein content ranged between 15 and 20%. The methionine content was found to be low in winged beans and bengal gram. In the other pulses, the mathionine content ranged from 1.1 to 1.8 per cent (g/100 g of protein).

(ii) **Oil analysis :** The experiment carried out on the keeping quality of sunflower oils showed the better performance of oil extracted from dehulled seeds than the oil extracted from whole seed. Out of 4 cultures tried, namely, EC 68413, 68414, 68415 and SUF1, the culture EC 68415 showed better keeping quality. Off flavour was detected in many of the oil samples after a period of 5 months.

(iii) **Nitrogen fixation :** Four nif-mutants were produced by NTG treatment in *Azotobacter chroococcum* characterisation of mutants was carried out by analysing enzymes concerned with nitrogen fixation and assimilation. *Azolla* strain from Aliyar, Aduthurai, Tirurkuppam and Pattambi were cultured in pots Except the strain from Tirurkuppam, the remaining strains failed to grow here. One fast growing strain of *Azolla* was isolated and is being grown separately. The growth of this strain was compared with the original strain. Growth of *Azolla* in N free medium having different pH was observed and the optimum pH was found to be 5.5 to 7.0.

(iv) **Plant biochemistry :** Capsaicin content in red and green chillies (CO.1, 63, Musalwadi) was analysed. In green chillies the capsaicin content ranged from 0 38 to 0.53% and in red chillies from 0.52 to 0.6[illegible]%. Analysis of biochemical constituents in seven varieties of tomato leaves showed that the concentrations of total protein, chlorophyll a and b and ascorbic acid increased with the age of the plant. At the flowering stage, total sugars and total phenolics were found to have inverse relationship.

In all the 12 varieties of sorghum samples subjected to periodical estimation of enzymes, increased activity up to 30 days was noticed and then the activity started decreasing. Chlorophyll content at 10 days' growth was found to be correlated with yield.

PHYSICAL SCIENCES

(i) **Forest soils :** In the study of forest soils in pulpwood plantations, it was found that increase in altitude resulted in the accumulation of organic matter, increase in fertility status and nutrient exchange capacity. Besides, soils of higher altitude were rich in nutrients and also had the capactty to preserve moisture. Hence cultivation in these high altitude soils will be profitable for hill crops.

(ii) **Salt water irrigation:** In the study of the effect of irrigation waters of different quality on the soils of Tamil Nadu, furrow slopping and mulch treatment have given better performance while using salt water for irtigation in the case of Ragi crop. Hence for rectifying the salt problem in irrigation water furrow slope planting and mulch treatment can be recommended to get a fair crop yield.

(iii) **Standardisation of extraction and estimation of essential oil:** In the study of essential oils from flowers, rose and pavazhamalli flowers as well as nutmug leaves were subjected to solvent extraction and steam distillation and the yield of concrete was found to be 0.14 per cent, 0.13 to 0.15 per cent and 0.1 per cent respectively.

(iv) **Tannin industry effluent and waste :** In the study of effect of wastes and effluents from tannin industries on the ecosystem, it was found that the use of boiler feed effluent even at 1 : 4 dilution affected the growth, nutrition and yield of ragi (CO 11) and blackgram (CO 3) crops, but the rhizosphere microbial population increased with the concentration of the plant. Due to use of effluent, the soil tended to become alkaline and accumulate water soluble salts. Maximum nitrogenase activity was observed on the 30th day of crop growth of pulse crop due to the irrigation of evaporator effluent from tan industry when the waste bark chips were iucubated for 45 days at 1 : 10 bark water ratio, more of Ca ions were released into solution. The application of wattle bark either raw or predecomposed did not bring about any reclamation effect on the sodic soil.

(v) **Utilisation of pollutants :** In the study on the better utilisation of pollutants, trials were conducted with cluster beans (local variety) as test crop using lime mud and cement dust as solid pollutants as against pure $CaCO_3$. The growth of the crop in general was satisfactory. The number and length of pods were more in lime mud treated plants than cement dust treated plants. The mean yield of pods was high (75 gm/pot) in lime mud treament followed by cement dust, pure Ca CO_3 and control (no liming material) respectively.

PLANT PHYSIOLOGY

1. **Rice**

(i) **Cold tolerance :** Among 264 Cultures cold tolerance at 15-18° screened for cultures T 1583, T 1633, T 1703, 1921, 1959, 2413, 2430 and 2457 were found to be highly tolerant and thus suitable for employing in breeding programme for evolving cold tolerant varieties.

(ii) **Grain maturation :** Certain aspects of physiology of maturation was studied in rice varieties ADT 31, CO 41, IET 3280 and ASD 15. The interesting feature was the behaviour of IET 3280 which showed a sustained moisture status during the development of the grain. Another point of interest was

that in IET 3280 and ADT 31 germination was initiated even on the 15th day subsequent to flowering, thus indicating the fact that there was no dormancy On the contrary ASD.15 showed high dormancy.

2. Pulses

(i) **Blackgram :** The study on the effect of foliar fertilization in CO 4. blackgram showed that foliar potassium at one per cent level gave the highest yield (1440 kg/ha) at pre - flowering and peak-flowering stages. A net Increase of 54 kg/ha of seed yield was recorded accounting to net profit of Rs. 384.67/ha.

(ii) **Greengram :** Foliar nutrition f N, P, K and S was studied in CO 3 greengram, in different combinations. Among the treatments, basal N (25 kg/ha) and P (50 kg/ha) along with foliar N, P, K and S (1 per cent) gave the highest yield of 793.5 kg/ha. The next best treatment was two foliar sprays of K alone (1 per cent) which registered 713.0 kg/ha. These were given at stray and 50 per cent flowering. These were against the control which gave an yield of 6?6.3 kg/ha. The best treatment gave an increase of 97.2 kg/ha over the control. An amount of Rs. 253.75/ha was registered as an extra income.

3. Cotton

Topping and Planofix for cotton : A combination of planofix and topping was tested on twelve genotypes of cotton. Foliar spray of planofix at 5 ppm at stray flowering followed by topping on 85th day recorded high yields among the traatments. Among the selected varieties, Varalakshmi gave highest yield (2637 kg/ha) followed by MCU. 7 (2250 kg/ha), MCU.9 (2188 (kg/ha), MCU.5 (2046 kg/ha) and MCU.8 (1987 kg/ha). The increase in yield ranged from 13.0 to 34 0 per cent over the control giving a net additional profit of Rs. 700 - 2200/ha. The results were significant at one per cent level (Table 62).

TABLE 62. Effect of Planofix (P) and Topping (T) on the yield of cotton.

Variety/ Hybrid	Treatments	Yield of seed cotton (kg/ha)	Net Income (Rs.)	Net Profit/ha (Rs.)
	C	900	5400	1222
SUJATHA	P + T	1121	6622	
	C	962	5772	
SUVIN	P + T	1221	7276	1504
	C	1396	6282	
BHARATHI	P + T	1875	8387	2105

MCU 5	C	1692	7614	
	P + T	2046	9157	1543
MCU 7	C	1742	7839	
	P + T	2250	10075	2236
MCU 8	C	1600	7200	
	P + T	1987	8891	1691
MCU 9	C	1672	7524	
	P + T	2188	9796	2272
CRH 71	C	1612	7254	
	P + T	1850	8275	1021
C 50	C	1608	7236	
	P + T	1992	8914	1678
ELS 250	C	1291	5809	
	P + T	1458	6511	702
ELS 294-2-6	C	1588	7146	
	P + T	1958	8761	1615
VARALAKSHMI	C	2042	9189	
	P + T	2367	10601	1412

4. **Groundnut**

(i) **Efficacy of supplementing foliar urea with basal gypsum incorporation** : The treatment gypsum on 45th day with 1 per cent urea on the 50th day gave the best yield increase of 39.1 and 15.2 per cent over control in TMV 7 ahd Pol. 2 respectively. This was better than gypsum or urea alone. In the urea-gypsum combination, yield increase was matched by quality characteristics of better shelling percentage, 100-Kernal weight and mature/immature ratio.

(ii) **Nutrient spray for pod development** : The combined effect of foliar urea (1 %) and phosphorus extract (1 %), proved effective in increasing the yield upto 20.1 and 19.8 per cent over control in TMV 7 andPol.2 respectively. The associated quality characteristics such as shelling percentage, 100-Kernel weight and mature/immature ratio were also enhanced in this treatment.

(iii) **Comparative studies on distal and proximal kernal in groundnut bunch varieties** : It was interesting that distal kernels yielded better than proximal kernals by 26.3 Vs 31.4 per cent over control in TMV 7 and 27.6 Vs 28.9 in Pol.2. Hence the employment of proximal kernels with superior quality characters is to be preferred, as the reduction in yield was only marginal compared to distal kernals.

Foliar Diagnosis Laboratory : A foliar diagnosis laboratory was established in July, 1979 which functions as a service centre for identifying physiological and nutritional disorders in crops. Besides, recommendations towards

correction of disorders will be made. Duing the year major enquiries on the subject were on rice, cotton, turmeric, jasmine, crossandra and others. The nature of the physiological affections and suggested corrections are given in the following statement.

TABLE 63. Disorders in certain crops and recommendations suggested.

Crop	Nutritional or physiological	Recommendations
Rice	Yellowing in Rice	Dissolve 6 kgs of superphosphate in 10 litres of water and keep it over night. Decant next day and make up to 100 liters of water. Add 500 mg of magnesium sulphate to the above solution.
Cotton	Reddening of leaves	Spray 5 per cent magnesium sulphate, 1 per cent urea and 0.05 per cent zinc sulphate.
Turmeric	Marginal and tip drying of leaves in 3-4 months old crop	(A) Dissolve 9 kg of superphosphate in 4 to 5 litres of water. Keep over night. Stir a few times. Decant the top layer and make up to 100 litres and spray on one acre of the crop.
	i) Older leaves presenting scorched tips.	To the above solution (A) add 150 g of borax.
	ii) Pale yellow leaves with irregular grey spots	To the above solution (A) add 150 g of borax, 15 g of copper sulphate, 150 g of zinc sulphate and 1.5 kg of magnesium sulphate.
	iii) Motled yellow leaves	To the solution (A) add 150 g of zinc sulphate Spray the solution in the morning.
Jasmine	Yellowing of terminal leaves	Dissolve 500 g of ferrous sulphate and 500 g of urea in 100 litres of water (per acre).
Crossandra	Yellowing of terminel leaves	Spray 0.5 per cent ferrous sulphate solution.

FISHERIES SCIENCE

1. Fishery biology

i) **Fish and prawn culture in water recirculation system** : In the indoor water recirculation unit experiments have been carried out with carps such as *Cirrhinus mrigala*, *Labeo fimeriatus* and *L. rohita* and prawn species *Macrobrachium malcomsonii*. The results showed that prawns weighing 1.0 to 1.9 g have grown to 16.7 to 19.2 g in 200 days. In the case of *C. mrigala* (fingerlings) the relative growth rate was higher when the stocking density was low and the feed level was 4 per cent body weight. On the otherhand in *L. fimbriatus* higher growth was obtained with a larger stocking density with a feed level of 7 per cent body weight.

(ii) **Protein requirements of rohu and mrigal :** Rohu fingerlings grown at 29°C had maximum percentage assimilation efficiency, gross growth efficiency and net growth efficiency as 70.14, 13.55 and 19.31 respectively at 40 per cent protein feed. At low temperature (22°C) also the same trend was noticed. It was also seen that the relative growth rate was about equal in the case of 40 per cent feed at both the temperature. It was observed that in the case of mrigal all feeds above 20 per cent protein concentration were showing fairly uniform growth as the food conversion ratio noted was between 2.1 and 2.7.

(iii) **Energy and nitrogen balance in rohu and common carp :** Net growth efficiency (K_2) showed an increasing trend in relation to feed level and the values were 10.19, 18.40 and 20.48 at 2 per cent, 4 per cent and *ad lib* levels feeding, respectively. The energy balance/g body weight/day worked out showed that the energy retained through 2 per cent and 4 per cent feed levels showed an increasing trend and the value were 0.025 K cal (5.26%) and 0.086 K. cal (11.48%) however, in *ad lib* level the retention was poor (4.76%) compared to the consumption. The energy loss through metabolic activities was also more as the feed levels increased from 2 per cent to *ad lib*. The nitrogen balance/g body wt./day worked out in rohu showed that the loss of nitrogen through metabolism was more in *ad lib* feed level (55.44%) compared to 2 per cent, (34.90%) and 4 per cent (31.67%) feed levels.

The energy and nitrogen balance studies made with common carp showed that the relative growth rate, gross and net growth efficiencies were also more (0.016 g, 11.90 % and 16.84 %) in smaller animals than in the bigger ones (0.012 g, 8.38% and 11.28%). However, the assimilation efficiency was higher in the bigger animals than in the smaller animals.

(iv) **Influence of oxygen on growth and energy and nitrogen balance in mrigal :** The food conversion ratios obtained showed that the ratio was better (2.14) in higher oxygen level than at the low oxygen level. The assimilation efficiency, gross growth efficiency and net growth efficiency were also higher in higher oxygen level when compared to the low oxygen values. The energy retained and the heat output through metabolism were also found to be more at higher oxygen level than at the low oxygen level. Similarly the nitrogen balance worked out showed that the nitrogen retained as meat was higher (1.786 mg. N; 17.53%) in higher oxygen level than that of low oxygen level (1.053 mg N; 9.76%)

(v) **Energy utilisation in carps :** Metabolic rates and random activity of grass carp and Chelkandai *(Labeo fimbriatus)* were measured in an annular chamber and also in a swimming tunnel so as to obtain the estimation of energy utilisation of the fishes. Mean routine oxygen consumption, ammonia excretion, ammonia quotient (A.Q - molar ratio NH_3 excreted to

O_2 consumed) and random activity were found to be 129.8 mg/kg/hr, 25.3 mg/kg/hr, 0.19 and 2.5 counts/hr (grass carp) and 72.16 mg/kg/hr, 15.68 mg/kg/hr, 0.22 and 33 counts/hr (Chalkandai) respectively.

(vi) **Reproductive biology in marine cat fish :** In an experiment to study the efficiency of the pituitary of marine cat fishes (*Thalassinus* sp) in induced breeding, a pair of common carps *Cyprinus carpio* were injected with the pituitaries (3 mg to the female and 2 mg to the male) and 50,000 hatchlings were obtained.

(vii) **Toxicity studies in aquatic organisms :** The biocide mahua oil cake has been tested for their toxicity in catla and rohu fingerlings. It was found that these fingerlings survived at 50 ppm concentration indefinitely and at a lethal dose of 100 ppm the fingerlings died within 24 hours.

2. Fish culture

(i) **Composite fish culture :** At Tuticorin, experiments on composite fish culture with different species combinations and stocking densities (1850-4000 Nos/ha) were carried out in earthern ponds of different size. A minimum production of 1016 kg/ha/yr was obtained from 0.2 ha pond with four species combination (silver carp, grass carp, mrigal and common carp at 4.1, 13.7, 20.4, and 54.8% respectively) at a stocking density of 1850 Nos/ha and a maximum production of 3779.2 kg/ha/year from a pond of 0.1 ha size with six species combination (silver carp, catla, rohu, mrigal, common carp and grass carp; 31.0, 6.2, 3.8, 17.5 and 12.5% respectively) at a stocking density of 4000 Nos/ha. The individual growth of silver carp and grass carp was found to be higher (1.95 kg/year) at lower densities and 1.08 kg/year at higher densities, though the total production was less at lower densities.

At Pondicherry studies on composite fish culture under different patterns of flushing (daily flushing, weekly flushing, fortnightly flushing, and stagnant ponds) using catla, rohu, mrigal, common carp and calbasu at 4200/ha density were continued. Maximum production was noted in weekly flushed pond and the minimum in stagnant pond. Production was almost same in daily and fortnightly flushed ponds. But for *Calbasu* all the fishes recorded higher length and weight in weekly flushed pond than other ponds.

Fishers were healthy in all the treatments but for mrigal in stagnant pond where it showed haemorrhogic septicaemia infection. The calculated production in weekly flushed pond was 3.00 tonnes/yr/ha.

At Bhavanisagar, mrigal, common carp, *Labea fimbriatus* and silver carp were stocked in five ponds of 0.05, 0.03 and 0.011 ha area at 5000, 4000 and 3000/ha. The total rearing period was 12 months. The species ratio was

maintained at 3, 2.5, 2.0,and 2.5. The annual yield in all ponds were 860, 1320, 2100, 1433 and 1300 kg/ha respectively. The growth rate of the individual species showed mrigal, silver carp, common carp and fimbriatus in the order. The rate of production for 1 kg of fish worked out to Rs. 2.56 in this year.

(ii) **Murrel culture :** Experiments on the influence of depth of water on survival of the young ones of murrel, *Channa striatus* were carried out in three identical cement ponds (5x5 M^2) with varying water depths of 0.5, 1.0 and 1.5 feet respectively. Lots of thonsand numbers were introduced in each pond and they were fed with equal amount of notonectids. The survival rate of murrel young ones was found to be 56.5, 46.0 and 28.6 per cent in the ponds of depths 0.5, 1.0 and 1.5 feet respectively.

(iii) **Culture of freshwater prawn** *Macrobrachium* sp : One earthern pond of 0.1 ha was stocked with fresh water prawn *Macrobrachium* sp and other fish species viz., *Cyprinus carpio* and *Mugil* sp. The stocking rate was 8000/ha from prawns and fishes 4000/ha (Mullet : 2000/ha and common carp: 2000/ha). The stock was harvested after six months.

The prawns showed a growth of 5.4 cm. in length and 8.0 gm in weight while the fishes showed a growth of 14.0 cm length and 147 gm in weight with regard to *Mugil* sp. and common carp showed 102.5 cm legth and 218.5 gm in weight.

(iv) **Brackish water prawn and fish culture** : Culture experiments were carried out in the earthern pond (0.1 ha) in which salt water from a bore well and fresh water were mixed to obtain a salinity of about 20 p.p.t. The prawns *Penaeus indicus*, *P. semisulcatus* and fish *Mugil* sp. were stocked in the fertilized pond. The prawn showed a growth 8 5 cm in length and 10 gm in weight while the fish increased from 6.0 to 23.0 cm in length and 6.5 to 15.8 in weight. This experiment was conducted with abandoned salt pan water during raining season.

(v) **Sewage fed fish culture :** *Monoculture of Tilapia* Monoculture of tilapia *Sarotherodon mossambicus* was tried in the sewage fed fishponds which received highly stabilised water from the sewage oxidation pond of Government College of Technology hostel, Coimbatore. Totally within 3 years this pond system yielded 966 kgs of fishes which included the periodical removal of fingerlings. The above works out an annual production of 13413 kg per hectare per year without addition of fertilizer and other recurring expenditure on account of feed and power consumption.

(vi) **Mass culture of Larvivorous fishes :** Availability of the mosquito larvae eating fishes *Aplocheilus blochii* and *Oryzias melastiqma*, were surveyed in 4 communes around Pondicherry. A survival of 52 per cent

(*O. melastigma*) and 39 per cent (*A. blochii*) was observed in ponds stocked at 2-3 lakhs/ha. *Oryzias melastigma* bred both in fresh water and 10 per cent sea water. *A. blochii* bred in fresh water only. Hatching time and generation time of *O. melastigma* were estimated to be one week and 3 months respectively.

(vii) **Induced breeding and fish seed production**: *Catla catla*, (Catla) *Cirrhinus mrigala*, (mrigale) *Labeo fimbriatus*, (Chelkandai), *Cyprinus Carpio* (common carp) and *Hypohthalmichthys molitrix* (silver carp) were the five different species attempted for induced breeding, using pituitary gland extract infection. With 2 split doses for all, except for silver carp wherein 3 split doses were administered, for the activation of female and 2 split doses for male. The dosage was given as 5.7 mg per kg weight of the fish. For silver carp it was as 4, 6, 8 mg with the interval of 6 hours.

Except silver carp, all the fishes bred successfully in the next day and nearly 2.8 lakhs of hatchlings were obtained viz., mrigal 1 lakh, catlle 0.8 lakh. *Labeo fimbriatus* 0.5 lakh and common carp 0.5 lakh respectively.

3. **Fishery Environment**

(i) **Thermal tolerance of Tuticorin bay**: In a study of thermal tolerance of fishes and crustaceans in Tuticorin bay 8 species of fishes and crustaceans naturally occurring in the bay were collected and maintained. Overnight at the temperature of 28°C and salinity of 6 ppt in the area of collection. The animals were subjected to graded increase (0.5°C/15 min) in temparature to simulate exposure in a thermal gradient. The upper median lethal temperature (LT_{50}) for the 8 species tested were in the order of *Squilla* sp. (38.0°C)<*Gobius optomus* (40.6°C) *Tetradon leopardus* (40.7°C)<*Penacus indicus* (41.7°C)< *Syngnathus carce* (42.0°C)<*Scatophapus arous* (42.3°C) <*Mugil* sp. (42.7°C)<*Therapon iarbua* (43.5°C).

The values of LT_{50} for the milk fish *Chanos chanos* fingerlings (accli mated at 30°C) were tested at 40.5, 41.0, 41.5, 42.0 and 42.5°C. A comparison of various species studied indicates that the milk fish has a higher tolerance than even *Channa punctatus* and *Tilapia mossambica*.

(ii) **Thermal pollution - Pre release survey of Tuticorin bay**: A pre-releases survey of the fauna and flora occurring in the vicinity of the Tuticorin Thermal Power Plant was conducted during the year 1979. Various hydrographical parametars like atmospharic temperature, water temparature, salintly and Oxygen collected are given in Table 64.

TABLE 64. Hydrographical parameters in the vicinity of Tuticorin Thermal Power Plant

Month	Atmospheric temperature (°C)	Water temp. (°C)	Salinity (‰)	Oxygen ppm	Plankton vol. (ml.)
April' 79	30.5	30.0	68.6	8.0	5.0
May	28.0	28.5	36.1	7.8	8.4
June	28.5	28.0	35.0	8.1	16.5
July	30.2	28.6	34.0	8.5	10.5
August	28.0	31.0	36.41	8.2	10.7
September	26.0	29.0	30.0	8.84	9.0
October	29.2	29.0	25.0	8.0	24.5
November	27.5	31.0	0	7.8	11.5
December' 79	26.5	27.0	35.8	8.4	20.0

For biological parameters, finfishes and plankton were collected every fortnight and the area was found to be inhabited by prawns of commercial importance like *Penaeus monodon*, *P. semisulcatus*, *P. canaliculatus* and *P. indicus*. Among fishes, *Scomberomorus* spp., *Mugil cephalus*, *M. paraia*, *Lates calcarifer*, *Sillago sihama*, *Sardinella sirm*, *S. fimbriata* were abundant. This area was also found to be a good source for fish seed of commercially important species like, *Mugil* spp., *Caranx* spp., *Thyrssa* sp., *Sillego sihama*, *Lates calcarifer*, *Leiognathus* spp., and *Stoleohorus* sp. Among phytoplankton, *Coscinodiscus* sp., and *Peridinium* sp., were encountered in fairly good numbers and *Acartia* sp., *Plurobrochia* sp., *Lucifer* sp., Mysis of prawns were the zooplenkton obtained.

(iii) **Low Oxygen tolerance of fishes** : Experiments on low oxygen tolerance of the fingerlings of exotic carps (Silver carp and grass carp) and Indian major carps (catla, rohu and mrigal) have been carried out by exposing them as a group in a graded decreases (0.09 mg/min.) of ambient oxygen concentration in a closed container, The asphyxiation level of oxygen for the species tested were 1.76 1.72, 1.65 and 1.63 p.p. m for silver carp, catla, rohu, grass carp and mrigal respectively. The levels of oxygen at which the mortality occurred were 1.65, 1.60, 1.59, 1.55 and 1.53 p.p.m. for silver carp, catla, rohu, grass carp and and mrigal respectively. Among the five species tested silver carp is least tolerant to low oxygen and the mrigal is the most tolerant.

(iv) **Influence of sewage on near shore waters of Tuticorin** : Monthly water samples were collected during late monsoon and post monsoon periods in the breakwater zone of Tuticorin bay where there was heavy disposal of sewage. Near the sewage disposal area, water samples showed salinity values less than 12.4 p.p.t. BOD studies showed depletion of oxygen within 5 days of incubation period. Since apparent oxygen utilisation is dominant during low tide, it seems

that the self purification of the system depends much on the extent of tidal oscillation and consequent deletion of organic matter.

4. **Fishery Technology**

(i) **Design, fabrication and use of a cheap and simple Solar Drier for fish drying** : A simple box type laboratory model solar drier was fabricated. The bottom and back sides of the box were of hardboard painted back. The remaining four sides were closed with clear polythene sheets leaving narrow openings near bottom and top to allow inflow and outflow of air to facilitate drying of fish placed inside. When placed in the sun on sunny days between 9.00 and 15.00 hours it was found that an increase of 10°C in the temperature inside the drier over the ambient temperature could be achieved within 5 to 10 minutes of placing in the sun.

The rate of drying of salted fish when dried by placing in the drier was assessed and compared with that for the same material dried by sundrying in the traditional manner. The rate of drying was nearly 50% faster in the solar drier as compared with the traditional method of sundrying. The solar drier offers a faster and hygenic method for fish drying.

(ii) **A special type of Millet gill net** : A type of Aerial trap was designed and the fabrication of the gear was completed. The aerial trap or otherwise known as the raft trap was constructed by securing plantain trunks together along with the line of the gear. Twigs or bamboos attached with webbings were kept on the surface of the trap and along the main webbings. When the fishes were either moored or drifted, the fishes are either driven towards the raft or the fishes come in the way of raft are caught. Twigs spread on the raft prevent further leaping by the fish. The lengh of the line to which the plantain trunks are attached was about 200 to 300 metres. The net is formed by securing webbing to bamboo poles driven to the ground in an oblique manner. The webbing consists of two portions viz. an upper or above water portion and a lower or under water portion. The upper section of webbing has a fold towards its lower periphery. When it leaps and hits the upper section, the fish falls down into the fold. The webbing used in this gear is made up of Nylon with a mesh size of 5.5 cm. and the ropes used for the hanging of the net are 6 mm. monofilament rope. The scare line used is of Hemp or coir rope,

LANGUAGES

The Agricultural technical words in thirunelveli District are unique and have regional quality. Roughly 1200 Agricutural technical words have been collected: *Valam* is used to identify the rectangular fields. Paddy field with irrigational facility is mentioned by the word *Theerasam*. Grains are noted by the word *Thavasam* and onion is by *Eerankam* or *Eerulli* Tapioca is identified by *Eazhilai Kizhanku*. These usages have the regional quality. *Konta Kario-*

chan, Murasilai paytal, Paccalai Noy, Picin Noy and *Karuppatti Noy* are some of the regional words related to plant pathology. Like these words, many are used with unique and regional quality.

In the task of collecting the Agricultural technical terms, 1500 technical words on Agricultural Botany and equallant Tamil words have been collected and classified alphabatically. For example, some words are given below: பேக்டீரியா and பேக்டீரியா இயல் are the given Tamil versions for the words Bacteria and Bacteriology in many of the English - Tamil Dictionaries. But the words அணுஉயிரி, அணுஉயிரி இயல் are the newly coined words in this new Dictionary. Further the words like Auxnometer, Bacillus, Bivalent and Calyptra, பயிர் வளர்ச்சிமானி, நோய் நுண்மி, இரிணைத்திறனி, வேர் நுனிமுடி are coined respectively as Tamil equivalents. Like these, many Tamil technical words in this Dictionary work.

The Department of English and Language Communication carries out teaching and researah relating to a) English as a medium of learning Science and Technology (EST), b) Higher Education in Agriculture and c) Language of Communication for Agricultural Extension Education.

Under the studies relating to EST, as many as twenty discourses units of scientific communication like description, classification, instruction, etc., were identified and language tasks on them formulated. The method of communicative function approach coupled with training in forms of reasoning was found to improve the abilities of the students in respect of reading comprehension of authentic science texts. Findings focussing on tasks or activities like drawing patterns, making paper models, etc., with incidental teaching of English have been taken up by the British council, Madras as a model for teaching English in VIII standard and experiments are pursued by them.

Based on the studies on 'Higher Education in Agriculture' the Department offered a second inservice programme in 'Learning-Teaching' for the benefit of 36 Assistant Professors for five days. The key theme of the second in-service Programme was 'Towards A Learning Society'. A study on the 'Study Skills of the first year U G. students of Agriculture indicated a need for oriénting the students to such learning activities like 'note-taking, Library habits, group study, class room concentration, etc., and hence a two-day full time orientation course was organized to the first year U. G. students immediately after their admission to the University. A Book 'Learning-Teaching' comprising the lectures and work sheets offered during the first In-service course, has been brought out by the University. Based on these, the Department has formulated two PG courses viz.. Eng. L C.602 'Learning - Teaching' for M. Sc., students and Eng. L.C. 801 Management of Education.

FACULTY OF AGRICULTURAL ENGINEERING

The Faculty of Agricultural Engineering consistsof four Departments viz. oil and Water Conservation, Farm Machinery, Agricultural Processing and Agricultural Structures. In the Soil and Water Conservation department, studies on drip irrigation for various crops, water shed management and suitability of saline water for irrigation were studied. The Department of Farm Machinery was engaged in designing pnewmatic cotton Picker, tool bar in which various implements like malur ploughs, harrows etc., can be attached and low cost bio-gas plant. Development of animal scarer, Kovai planter, hand tool for plucking papaya fruits and solar cooker were some of the achievements of the Department of Agricultural Processing. The Department of Agricultural Structures carried out research work on designing and developing cheap outlet structures for low pressure pipline irrigation system and standard type designs of thrashing floor, drying floor etc. The summery of the research findings of the above Departments are presented below :

SOIL AND WATER CONSERVATION

(i) **Drip irrigation studies** : Experiments were conducted on drip irrigation with crops raised on either side of the dripping holes and the performance has been evaluated (Table 65).

TABLE 65. Influence of drip irrigation on the yield of banana.

Description	Water applied (cm)	Rainfall (cm)	Total consumption (cm)	Yield (kg/ha)
Drip with single plant/hole	30	15	45	11700
Drip with double plant/hole	30	15	45	12000
Control with furrows	95	15	110	11500

Studies on drip irrigation with respect to its efficacy for germination of different crops and optimum lengths for inform flow distribution with difference types of emitters were carried out. (Table 66).

TABLE 66. Influence of two different methods of irrigation on the germination of crops

Method	Papaya	Cotton	Bhendi	Radish
Drip	90.0	91.6	88	95
Control	65.5	84.0	75	85

Based on these studies it was inferred that the germination was 10 to 15 per cent higher in drip system compared to control for cotton, papaya, bendi and radish. Low discharge emitters increased the optimum length of laterals with respect to uniformity of flow.

(ii) **Watershed management :** More than the diversified, individualised application of land for agricultural production an integrated approach on watershed basis was found to yield maximum prosperity. The integrated approach includes delineation of the land requiring soil conservation measures such as contourbund, random tie ridging land levelling and strip cropping, the area fit for garden land cultivation, fit for wet land practices, fit for grass lands or afforestation. To practice the watershed approach, two watersheds viz. Pogalur and Kumarankundru water sheds were chosen and the management practices for adoption were identified for an area of 5470 acres.

(iii) **Saline water for irrigation :** An experiment was laid out at Adivalli in Udumalpet taluk for testing the suitability or otherwise of saline water for irrigating maize. The experimental trials included (a) alternate furrow irrigation,(b) double row raised planting bed furrow (c) sloping furrow (d) mulching and (e) control. The pH and E. C values of the soil solution extract and the field of the crop are given in Table 67.

TABLE 67. Influence of irrigating saline water on pH, EC and yield of maize.

Treatment	pH		EC		Yield (kg/Acre)
	Top	Bottom	Top	Bottom	
Alternate furrow	8.08	7.9	1.5	1.7	1650
Double row raised planting bed	7.9	7.9	2.4	1.4	1658
Sloping bed	7.9	7.9	2.0	1.1	1625
Mulching	7.9	7.9	1.9	1.7	1650
Control	7.9	7.8	1 6	1.5	1640

Though the yield discrepancy was not perceptible in different treatments the practice of double row raised planting bed has been observed to be advantageous from the point of view of crop growth and vigor.

(iv) **Irrigation for paddy :** Measurement of irrigation water as given by the farmers in canal as well as well irrigated areas was carried out. The farmers in the Coimbatore District are found to give a constant rate of irrigation water at 10 mm per day at the well irrigated locations irrespective of the season or the stage of the plant. In canal irrigated areas they give progressively increasing rates of irrigation with the growth of the plants. The quantum of irrigation given in canal areas is more than double of irrigation water given at well irrigated areas under garden land conditions. The irrigation pattern may be depicted by the equations:

$$y = 1.02\,x + 3.60 \text{ (well irrigated)}$$

$$\text{and } y = 0.01\,x^2 + 1.10\,x + 11.00 \text{ (canal irrigated)}$$

where y = cumulative water given in cm

x = the number of days elapsed

FARM MACHINERY

(i) **Design aspects of penumatic cotton picker :** Major cultivated cotton varieties viz. MCU. 5, MCU. 6, MCU. 7, MCU. 8, MCU. 9, Varalakshmi and Suvin have been chosen and their pertinent boll characteristics influencing the cotton picking have been studied. Based on distorted model study radial type with forward curved blades of blower has been taken as a test rig which was a magnified version of a blower found in an Aspee Bolo knapsack sprayer. For maximum efficiency and flow rate, the following operational parameters have been identified.

a) Suction side	—	Duct diameter	—	7.62 cm at 225 degree inclination
		Flow rate	—	2.45m^3/min
		Pressure coefficient	—	4.50
		Volume coefficient	—	0.039
b) Delivery side	—	Duct diameter	—	10.16 cm at 0 degree
		Flow rate	—	9.69m^3/min
		Pressure coefficient	—	1.10
		Volume coefficient	—	0.03
c) Impeller speed			—	3200 RPM
d) Pressure drop			—	28.9 gm/cm^2
e) Efficiency			—	65 per cent

Rheological properties, physical properties and two dimensionless numbers (Reynold's number and Froude number) which are influenced by the seed cotton, have been determined and correlated with the parameters concerned to picking. A dimensionless nomograph has been attempted to generalise the design criteria based on the seven varieties studied. A model pneumatic picker has been designed under the theory enunciated have been tested and verified. It has been observed that the picker could be used for picking the variety MCU. 9.

(ii) **Design and development of a multi purpose tool bar :** Two units, one with 'L' angle as frame material and the other with G.I. pipe as frame material were designed and fabricated. The field capacity of these two units when using melur ploughs was found to be 0.1425 ha/hr whereas the field capacity of a conventional country plough was 0.05 ha/hr. The cost

of G.I. pipe unit was Rs. 285/- whereas the cost of the unit with 'L' angle was Rs. 235/-. The weight of the unit with G.I. pipe and with 'L' angle were 63 kgs and 42 kgs respectively. The units were tried in the Millet Breeding Station and Wetlands in Coimbatore campus and comparison was made and the results are presented in Table 68 and 69.

TABLE 68. Test with G. I. pipe frame

Attachment	Draft in kg.	Field capacity in ha/hr	% of savings in cost operation/ha	% savings in time of operation/ha
Five melur plough bottom	78.0	0.1425	46.2	49.7
Five cultivators for garden ands	70.0	0.2050	65.3	68.4
Four cultivators for wetland	74.0	0.0945	45.6	48.7
Two ridgers	67.8	0.1101	47.5	50.4
Two bund formers	89.0	—	50.0	50.0

TABLE 69. Test with 'L' angle frame

Attachment	Draft in kg	Field capacity in ha/hr	% of savings in cost operation/ha	% savings in time of operation/ha
Five melur plough bottoms	76.0	0.1425	47.4	49.7
Five cultivators for garden lands	69.0	0.2050	66 8	68.4
Four cultivators for wetland	72.5	0.0945	46.7	48.7
Two ridgers	67.0	0.1101	48.0	50.4
Two bund formers	89.0	—	50.0	50.0

(iii) **Low cost biogas plant (TNAU Model II)** : A low cost biogas plant based on Chinese technology has been constructed by means of half brick wall over the foundation of cement concrete 1:4:8. A wall was constructed by using cement mortar 1:6. inner plastering was done with cement mortar 1:3. inlets and outlets were attached to the plant such that top levels were above the ground level in order to avoid the entry of surface runoff water. The prefabricated arch shaped doom with iron-grills and chicken mesh was erected over the half brick wall and plastering was done over the wire mesh on both sides. The gas outlet was attached at the top of the plant.

The total capacity of the plant is 7.6 m^3 i e. the gas holding capacity is 2.5 m^3. There was no rusting probrem due to the absence of iron or steel material. There was no choking due to the absence of moving parts. The daily gas output was 1500 litres for the daily 50 kg cowdung addition. It was subjected to minimum diurnal temperature fluctuation. Since the

plant has the constant volume high pressure gas held it permited longer conveyance of the gas. The calorific value of the gas was 3500 calories. The total cost of the plant was only Rs. 1300/-. The materials that were required are as follows : Cement 600 kg; Bricks 700 Nos; 1½" metal jelly ½m^3; Sand 6m^3; Chicken mesh 60' x 3'; ⅜" iron grills 15 kg; ¼" iron grills 15 kg; 22 G.G.I. Wire 1 kg; ¾" G. I. pipe 2m; ¾" G.M. Gate valve 1 No.; ¾" G.I. Elbow 1 No. and Cement pipe 20 cm dia 80 cm.

AGRICULTURAL PROCESSING

(i) **Animal scarer :** An animal scarer which produces an explosive noise at desired intervals has been developed. The gadget will be helpful to scare away wild bears and rabbits spoiling the crops in agricultural land adjoining the forest areas and on the hills. The radius of influence is about 120 metres. It costs Rs. 500 and the cost of operating it amounts to Rs.5 per night.

(ii) **Kovai planter :** Kovai planter is a bullock drawn implement to sow various crops like groundnut, sorghum, bengal gram etc., in 3 or 5 rows at a time. The draft required is 50 to 60 kg in the case of 3 tyned planter and 65 to 75 kg in the case of a 5 tyned planter and hence both can be easily pulled by an average sized pair of bullocks.

The coverage per day is about 2.5 to 3 acres and 4 to 5 acres in the case of 3 and 5 tyned planter respectively, The cost of sowing per acre is Rs. 8 and Rs. 5 respectively.

(iii) **Hand tool for plucking papaya fruits :** A simple hand tool for plucking fruits from papaya and other trees without damage has been developed. The tool consists of a long bamboo stick at one end of which is fixed a knife edge with a nylon bag below. An M. S. rod is bent into an elliptical shape at the front end of which a flat sharpened knife is provided. With this tool, a person is able to pluck upto 190 fruits/hour upto a height of 4 to 6 metre height. The cost of the tool is Rs. 20.

(iii) **Solar cooker :** It is a focussing type paraboloidal concentrator of 115 cm top dia, 40 cm depth and 20 cm focal length. The inside of the paraboloidal surface is smoothened by paper meche and 400 gram polyster film is pasted on this surface. A semi-automatic mechanism is provided as an optical arrangement for tracking the sun. The cooking pot painted with dull black paint is suspended/placed at the focal point of the solar basket. The time taken for boiling water/cooking rice is as follows : (a) Three litres of water will be boiled in 30 minutes. (b) 1 kg of raw rice will be cooked in 45 minutes. (c) Half kg of parboiled rice will be cooked in 45 minutes. The cost of cooker is Rs. 400.

(i) **Design and development of cheap outlet structures for low pressure pipline irrigation :** An outlet structure called the riser valve for low pressure

pipeline irrigation system developed was field tested and found to work efficiently. The maximum pressure of its working is 0.8 kg/cm^2 which is the range of low pressure pipeline. The cost of one valve works out to Rs. 26.

(ii) **Design and development of standard type designs of threhing floor, drying floor, farm roads and pavements** : Based on random survey, standardisation of sizes of threshing floor and drying floor for normal holdings of 5 ha, 10 ha, 15 ha and 20 ha were finalised. The type designs of these structures in respect of construction in black cotton soil and red soil using locally available materials were prepared. The quantity of materials required for construction were also estimated.

FACULTY OF VETERINARY AND ANIMAL SCIENCES

Research on various facets of animal production and health was undertaken for improving the production potential of livestock in Tamil Nadu. Health problems affecting the pet animals were given adequate attention. In cattle, the main emphasis was on the fundamental and applied aspects of male reproduction, freezing of bovine semen, utilisation of non-protein nitrogen and finding out the most suitable exotic milch breed for cross breeding in Tamil Nadu. Studies on evolving a fine wool of sheep were taken up in addition to investigating a suitable grass and legume mixture for grazing. The nutritional requirements of pregnant sheep were also studied. In poultry, the effect of energy restriction during various stages of growth on meat and egg production was taken up for study. The inheritance of internal egg quality traits and the association between haemoglobin content and egg production were also under investigation. Slaughter house sanitation, carcass characteristics of sheep and tenderization of 'spent' chicken were among the various aspects taken up for research under livestock products technology. In the case of dogs, research on different pre-anaesthetics, anaesthetics and anthelmintics are under progress. The salient findings of research conducted in the Faculty of Veterinary and Animal Sciences are summarised in the following paragraphs.

1. Cattle and Buffaloes

Crossbred white cattle having Holstein Friesian, Red Dane and Jersery inheritance were examined for lactation length, lactation yield, age at first calving, service period, intercalving period and breeding efficiency. The performance of all the crossbreds were more or less same in respect of the above traits except for age at first calving which was lower in Red Dane and Jersey crosses compared to Friesian crosses. In view of the smaller size and higher fat percentage, use of Jersey for crossbreeding is preferable in Madras City and its neighbourhood.

Desoxyribonucleic acid (DNA) content of spermatozoa was estimated from 19 ejaculates of 7 Murrah buffalo bulls. The average DNA content from

Murrah buffaloes studied was found to be 2.83±0.84 pico grams/sperm. There was no correlation between DNA content and semen quality it terms of mass motility, concentration, percentage live sperm and conception rate.

Structural composition, diameter and total length of the seminiferous tubules of the buffalo bulls were worked out. The diameter of the seminiferous tubles was 218±17.60 meters and tubular length was 1263.407 meters. A gram of testicular tissue had 18.479 meters of seminiferous tabules. The productive volume and weight of the buffalo testis was arrived at by applying a correction factor. The production tissue weight and volume were 68.37±17.29 grams and 66.73±17.16 cc respectively. The frequency of the stages of seminiferous epithelial cycle for the buffalo bull was worked out.

Effect of different methods of thawing on revival rate was studied. Frozen bull semen showed 30.78, 37.53 and 43.00 per cent revival rate when thawed in atmospheric air, in water and water bath maintained at 40°C. It was concluded that thawing of frozen semen straws at 40°C for 30 seconds gave the highest revival rate.

Studies on protein and non-protein metabolism in ruminants were taken up. Normal ration cotaining maize, groundnut cake, wheat bran and rice polish was fed to two fistulated steers and the utilisation of groundnut cake was compared with a ration containing groundnut cake, wheat bran and rice polish (non-cereal ration). Experimental ration comprising of maize, groundnut cake, wheat bran and urea which replaced 25% protein of groundnut cake was utilised better with a cereal ration containing maize than with non-cereal ration. Groundnut cake could be profitably replaced with urea at 25% level.

A thermocole freezing unit consisting of a rectangular box made of thermocole measuring 40 x 25 x 27 cm and a freezing rack made of stainless steel was designed, fabricated and successfully used at frozen semen bank of Madras Veterinary College for freezing of bovine semen. Mean revival rates of 44.92±0.60% and 40.22±3.89% were obtained for cattle and buffalo semen. The chief advantage of this unit is that it is cheap, very light and can be carried to bull stations and farms for carrying out freezing on the spot. This is the first of its kind designed.

Lactation was successfully induced in sterile non-lactating, non-pregnant animals with daily injection of estradiol-17 and progesterone given subcutaneously for a period of 7 days. The milk produced was almost equivalant to normal milk except its low lactose content.

Role of electrolytes on the absorption of volatile fatty acids in the rumen was investigated by Department of Physiology. The levels of sodium, phos-

phorus and volatile fatty acids were determined in two fistulated steers at two hourly intervals in rumen liquor. The above parameters were measured after feeding the animals with the following ration.

Ration I - 'Aavin' feed supplied by Tamil Nadu Dairy Development Corporation Limited.

Ration II - Groundnut cake, wheat bran and rice polish - Non-cereal ration.

Ration III - Groundnut cake, wheat bran and maize.

The total volatile fatty acids produced with the above three rations were 98.45 m M/litre 86.93 m M/litre and 94.02 m M/litre. Sodium level was 109.84 m Eq/litre, 107.64 m Eq/litre and 131.71 m Eq/litre respectively. Potassium level was 28.20 m Eq/litre, 35.02 m Eq/litre and 22.00 m Eq/litre respectively. Phosphorus level was 42.94 m Eq/litre, 34.85 m Eq/litre and 45.51 m Eq/litre respectively. On statistical analysis it was observed that there was no significant difference in the total volatile fatty acid production between the three rations, whereas with the cereal ration the rumen liquor had high phosphorus and sodium level than the other two rations. The non-cereal ration (Ration II) had a significantly higher level of potassium.

Data on the cost of rearing crossbred calves to the age of first calving at the Model Dairy Unit of Madras Veterinary College for 3 years from 1977 were analysed. The mean cost of rearing upto the first calving (at 911 days) worked out to Rs. 4,064.58, 80 per cent of which was towards feeding charges and 19 per cent towards labour cost.

The cost of production of milk in Jersey crossbred cows under urban condition was worked out for 3 years from 1-7-76 to 30-6-79. The cost of production per kg of milk and the net farm income for the years 1976-77, 1977-78 and 1978-79 respectively was Rs. 1.59 and 17,866.38, Rs. 2.06 and Rs.5,292-98 and 2.07 and 15,949-70 under prevailing conditions of managament.

Comparative economics of milk production in crossbred cows and Murrah she-buffaloes was worked out at Livestock Research Station, Kattupakkam. Eight animals in each of crossbred cows and Murrah buffaloes were involved in the study. The cost of milk production (per litre) worked to Re 0-90 and Rs. 1.61 for crossbreds and buffaloes respectively.

Nivaquine (M&B) (chloroquine sulphate) was used as a 10% solution in the treatment of tropical theileriasis in 30 cattle at the dose rate of 3 mg/kg body weight intramuscularly. Out of 30 animals 18 were cured and no untoward effects were noticed in the treated animals.

Serum calcium, magnesium, blood glucose and haemogram were studied in 12 calves affected with convulsive seizures. Eosinopaenia was

observed in all cases of convulsion in calves. The hypo-magnesaemia might be the main cause for the convulsive seizures in calves.

Rise in blood histamine level was recorded in different types of indigestion in the 24 animals studied. Antihistaminic therepy along with conventional drugs was found effective in cases of bovine indigestion.

30 animals with frothy bloat were treated with Dimol (Methyl Silicone), minerals, antibiotics and antihistaminics. The duration and cost of treatment were studied. Though the number of days to cure in all the drugs were almost same, based on the cost of drug for the treatment of frothy bloat, methyl silicone may be more useful than other drugs.

It was observed that spontaneous cases of Enzootic Bovine Haematuria showed marked and progressive anaemia and the blood loss in urine was found to very from 0.1 to 1.2%. Biochemical estimations revealed significant decrease in blood chloride, increased creatinine and blood urea nitrogen and a slight reduction in calcium, phosphorus and magnesium levels. Feeding of bracken fern to experimental animals was done. Of the four experimental animals, three develeped microhaematuria. Extracts of bracken fern revealed the absence of alkaloids and glycosides The ailing animals that died during the year showed lesions of chronic cystitis numerous sessile and reddish globular growth varying from 0.1 to 1.0 cm in size over the mucosa.

2. Sheep and Goats

A study was undertaken to find out the relative efficiency among Merino, Nilagiri, Merino-Nilagiri crossbreds and Rambouillet-Nilagiri crossbreds born during Feburay-April, 1978 lambing season with respect to body weight and wool yield at 180 days of age. The study with nine genetic groups revealed that there was no significant differences ($P>0.05$) between the different genetic groups with respect to body weight. Highly significant difference ($P<0.01$) between different genetic groups with respect to wool yield was observed.

With the main objective of finding out the number of adult sheep that could be maintained by a farmer according to the area he is holding as pasture in the Niligiris, 1595 square metres area of Kikiyu and Clover cultivated pasture was taken up for study. Animals were grazed from 10.00 a.m. to 12.00 noon and 3.00 p.m. to 4.30 p.m. each day for 8 months excluding the frost season. It was concluded from this study that 5 animals of average body wight of 56 kg could be maintained in one hectare of Kikiyu+Clover for a period of 8 months in the Nilagiri area.

Lambing percentages in Stavropol Merino in 1976 and 1977 October mating season were 45.6 and 59.8 respectively and in Grozney Merino 59.0 and 44.5 respectively. Statistical analysis was carried out to find the significant differences in mean rate of gain in body weight pooled over two years (1977 and 1978 lambing seasons), between different periods of growth (viz. 0-3 months, 3-6 months, 6-0 months, and 9-12 months) and the results were found to be highly significant (P<0.01). Maximum growth rate was observed in 0-3 months period of growth in both sexes and breeds.

Coefficient of correlation was worked out between body weight and wool yield at one year of age in Stavropal Merino and Grozney sheep breeds and the results were found to be positive and significant in Stavropol Merino.

Pre-weaning and post-weaning mortality percentages were more in Grozney Merino than in Stavropol Merino in both lambing seasons (February-April, 1977 and 1978).

(i) **Wool yield** : Highly significant (P<0.01) differences were observed between different age groups in mean greasy fleece yield. Maximum greasy fleece yield of 4.05 kg was observed at 3 years of age. Using Sandar's method to obtain correction factors for converting records of later clip to those of the first, repeatability co-efficiennt was estimated for greasy fleece yield and it was found to be 0.404.

(ii) **Fibre diamter** : No significant (P> 0.05) difference was observed between different age groups in mean fibre diamter and the repeatability coefficient was found to be 0 295

(iii) **Staple length** : Further study was also undertaken to find out the effect of age on staple length in Grozney Merino breed No significant difference (P >0.05) was observed between various age groups in mean staple length.

Studies undertaken under All India Coordinated Research Project to find differences in birth weight. weight at 90 days, 180 days, 360 days and at 2 years of age between different genetic groups revealed the following results:

Birth weight : Data for the years 1976-79 were taken up for study. Nilagiri, Merino, various grades of Merino-Nilagiri and Rambuillet-Nilagiri crosses were the genetic groups involved. The differences were found to be highly significant (P <0 01). 5/8 Merino - 3/8 Nilagiri lambs were found to be heavier (3.716 kg) at birth than the lambs of other genetic groups.

Weaning weight : On analysis of 90th day body weight, the difference. between different genetic groups was found to be highly signicant ($P< 0.05$) 5/8 Merino - 3/8 Nilagiri lambs were found to be the heaviest (12 290 kg) among the genetic groups.

Six months body weight : The differences in 180th day body weight of lambs of the different genetic groups were subjected to statistical analysis. The differences were found to be highly significant ($P<0.01$). ½ Rambouillet - ½ Nilagiri (F_1) lambs were found to be the heaviest (16.983 kg) among the different genetic groups compared.

One-year body weight : Among the various genetic groups studied, 5/8 Merino-3/8 Nilagiri were found to possess the highest body weight. (25.288 kg) The differences were found to be highly significant ($P<0.01$).

Two years body weight : Among the native, exotic and Rambouillet, and Merino crossbreds, 3/4 Merino - ¼ Nilagiri were the heaviest (35.01 kg) at two years of age. The differences were highly significant ($P<0$ 01).

Annual greasy fleece weight at two-years of age : Statistical analysis was also carried out to find out the significant difference in the mean annual greasy fleece yield between different genetic groups born during February-April, 1977. The differences were highly significant ($P<0.01$) and the maximum greasy fleece yield of 3.790 kg was observed in ¾ Merino - ¼ Niiagiri genetic group.

Blood potassium concentration, etythrocyte reduced glutathione (GSH) level and haemoglobin types were determined in blood samples collected from 212 Mandya and 98 Madras Red, and 102 crossbred sheep stationed at Livestock Research Station, Kattupakkam. The association between these biochemical traits and economic traits was studied The difference in GSH level betweed breeds was found to be highly significant The results of matings revealed that GSH types are controlled by a pair of autosomal allels with GSH^H being dominant. Birth weight was negatively correlated with GSH level in Mandya and Mandya x Madras Red cross. Low-potassium type sheep had higher lambing and weaning percentages. Haemoglobin AB (Hb AB) sheep were heavier than haemoglobin B sheep from birth to one year of age, and the difference was significant only for weaning and 6 months weight. Lambing per cent was significantly higher in Hb AB.

The usefulness of feeding concentrates to pregnant, Madras Red and Mandya sheep was investigated. Pregnant ewes were given concentrate mixture at different levels during last 1/3rd of gestation and lactation and their effect of dams' milk yield and growth of lambs was studied and compared with the group maintained on grazing alone. The milk yield of dams was high in lambs born to concentrate group and the difference was highly significant

(P<0.01). Considering the cost of concentrate, 200 gram/animal/day is recommended during last 1/3rd of pregnancy in view of the scarcity of pasture for sheep at Livestock Research Station, Kattupakkam.

A study to assess the possible use of urea in the practical rations for kids, was carried out. Six kids aged about 4 months were randomly distributed to three groups of two each. Group I served as control, group II received a ration containing 0.25% urea and group III received a ration containing 0.50% urea in the total ration. All these rations were isonitrogenous and a balance trial was conducted to study the efficiency of nitrogen utilised. The mean negative nitrogen balance recorded in the present study was −5.678, −7.2228 and −3.5145 for control group, groups II and III reepectively. During the period of experimentation, the animals lost weight in all three groups. It is concluded that adaptation to urea by the kids was comparatively less.

3. **Poultry :**

Effect of prolonged pre-incubation storage on the hatchability and malpositions in chicken eggs was studied. Two hatches were taken during July and August 1978 and other three hatches were taken during December and January 1979. The egg were randomly divided into 4 groups and stored in an air conditioned room, maintaining a temperature of 70° F and 80% R. H.

Treatment	Broad end up	Narrow end up
A	1 - 14 days	—
B	1st to 4th day	5th to 14th day
C	1st to 6th day	7th to 14th day
D	1st to 8th day	9th to 14th day

All the eggs were incubated and after completion of hatch, unpiped embryos (dead-in-shells) were opened to note the malpositions of the embryos. The results of the analysis indicated that there was no significant difference between treatments and that the storage position of eggs during pre-incubation period had no effect on hatchability. Nearly 50 per cent of the dead in shell eggs were having normal position, while malposition like the head and beak above the right wing, the head located at the narrower end and feet over the head followed the normal position percentage in the order mentioned.

Poultry offal meal was prepared by wet rendering and used at 5 and 10 per cent levels in broiler-finisher rations replacing W/W of fish meal, both with and without methionine supplemetation. It has been observed that there was some improvement in weight gain at 5 per cenr level; but at 10 per cent supplementation there was no difference in weight gain. However, methionine supplementation has significantly improved the growth rate at both the levels of poultry offal meal incorporation.

A preliminary investigation was carried out using two levels of energy (2900 k. Cal. and 3100 K. Cal. of ME/kg) and two levels of protein (22 and 24%) in White Leghorn as well as New Hampshire pullets. There were no significant differences between dietary treatments for body weight gain. Better feed efficiency was observed in high energy groups; however feed cost to produce one kilogram live weight was cheapest in the group fed diets containing 22 per cent protein and 2900 K. Cal. of M.E./kg (22:2900) followed by 24:2900, 23:3100 and 24:3100 groups.

Macrabin at the rate of 20 ml in 4.5 litres of drinking water was given to broiler upto 8 weeks of age. The results of this study showed that addition of Macrabin in drinking water for broiler chicks increased body weight at weeks of age when compared with the control group.

In broilers, restricting the feeding time to 16 hours from 3-8 weeks of age has resulted in significantly poorer body weight gains in comparison to the *ad libitum* controls. Further restricting the feeding time had no advantage regarding feed efficiency and survivability.

Influence of energy restriction during the growing period in White Leghorn pullets was studied. Two diets were formulated to contain 21 per cent protein - 2850 K. Cal. ME/kg and 15 per cent protein-2100 K. Cal. ME/kg. Each diet was fed to a group of chicks from 0-6, 0-12 and 0-18 weeks of age followed by the other diet upto 18 weeks of age. From 19 weeks of age till 40 weeks of age these birds were housd in individual cages and were fed with layer mash containing 21 per cent protein - 2600 K. Cal. ME/kg. During the experimental period, feed consumption, body weight at 1st egg, number of eggs laid upto 40 weeks of age, egg weight and mortality data were collected and analysed. Results of the study revealed that the restriction of energy from 0-6 weeks or 7-18 weeks of age could be adopted for better return in White Leghorns.

A trial was carried out to study the carcass yield in White Leghorn male chicks. Three treatments viz. 3-Nitro-Hoechst, TM-10 and control group without any additives were tried. Addition of 3-Nitro-Hoechst was found to be useful in increasing the carcass yield of the poultry.

The inheritance of initial egg quality traits waa studied in White Leghorn pullets maintained at Livestock Research Station, Kattupakkam. Egg weight, albumen index, Haugh unit, yolk index and shell thickness were found to be highly inherited and less influenced by environment indicating that selection for these traits would improve internal quality. Genetic and phenotypic correlations of egg weight with internal egg quality such as albumen index, Haugh unit and yolk index were high and hence eggs selected for bigger egg size automatically will have high egg quality.

A study on the pH, moisture, water holding capacity, extract release volume and the microbial load of *Longissimus dorsi* muscle from farm and market sheep showed that heavy farm female stock had higher number of desirable attributes than the other classes studied. The study outlined the necessity for sanitary handling of mutton during the early stages of processing

Tenderization of the meat of culled birds was conducted by using various agents. The experiment was conducted by using 'spent' hens over 72 weeks of age. Crystalline papain, Bromeline, crude papain and ash of crude papains and their combinations were given as intraperitoneal injections at different dose at 6 or 12 hours prior to slaughter. Superficial pectoral muscles were subjected to organoleptic evaluation and shear force value for determining tenderness The study revealed that the 'spent' chicken could be made tender by the injection of 1 ppm of ash of crude protein.

6. **Dogs**

Serum amylase activity was estimated by the Caraway method in 80 nondescript and 13 Alsation dogs. The mean value was 716.62 ± 5.40 Caraway units per litre There was no significant difference in serum amylase level between ages.

The efect of Eponol (Propanidid B. P.) which is an ultra-shot acting, nonbarbiturate anaesthetic was studied in dogs. A 5% solution of Epontol was used for the studies. Dosage trials carried out revealed that the safe dose to be 60 mg/kg body weight. 54 experiments were carried out on 54 dogs under 9 groups for studying Epontol as a sole anaesthetic and in combination with preanaesthetic agents. Marked excitement, convulsive seizures, salivation, defaecation and urination were the side effects during induction of anaesthesia without premedication. The duration of surgical anaesthesia was 7.14 minutes and there was marked transient hypotension. Premedication with atropine and diazepam produced smooth sedation, potentiated the anaesthesia with marked muscle relaxation and induced smooth recovery. Consecutive administration of this drug for 7 days did not produce any side effect.

Studies on transmissible venereal tumour in canines was continued. In the last passage which was started during last year one dog out of five developed neoplasm at the site of inoculation. Four more passages were complted during this year. Twenty dogs were used in the four serial passages done during this year. Of the 20 dogs used 15 developed neoplasms at the site of inoculation and in 2 animals metastasis also was noticed. In 11 out of 15 dogs spontaneous regression occured.

Xylazine (Rompur) was found to be a potent sedative, analgesic and muscle relaxant for dogs. It was very useful in controlling aggressive and nervous animals for routine clinical examination and perform minor surgical and obsterical procedures.

Ascorbic acid was found to be useful as a preanaesthetic at the total dose of 500 mg to 1000 mg prior to thiopentone sodium anaesthesia in dogs.

Ancylostomiasis in dogs could be treated effectively with a single dose of 50 mg of Levamisole/adult dog or also with Mebandazole at the dose rate of 600 mg/adult dog given at the rate of 1 tablet (100mg) twice daily for 3 days.

5. EXTENSION EDUCATION

The activities of the Director of Extension Education have been reoriented to the changing needs of the day by incorporating new thinking. The Communication centre highlighted the University's findings to the farming public, change agents and students through its modern audio-visual teaching materials like closed circuit television, radio recording equipments, automatic slide projector with recorded slide commentary and the like. The most popular programmes of the Communication Centre viz., Correspondence Course and Institutionalised Farm School on All India Radio were conducted on need-based subjects in an effective way. The Tamil popular journal "Valarum Velanmai" has been converted as monthly which was till then quarterly. The Tamil Nadu Agricultural University News Letter was improved qualitatively with more illustrations and greater details on the finding of agriculture, horticulture, agricultural Engineering, animal and veterinary sciences, forestry, fishery sciences etc. The number of pages has been enhanced from four to eight pages and number of copies mailed was increased from 1000 to 2000.

The Farmers' Training Centres at Coimbatore and Madurai concentrated on Lab-to-Land programme. Large Scale Compact Block Demonstrations, and made spade works for Adaptive Research Trials in addition to their regular training programmes. The Farmers' Training Centres at Orathanad and Hosur offered training in animal husbandry and other allied subjects.

The Krishi Vigyan Kendras / Farm Science Centres at Pondicherry and Tiruchirapalli trained rural youth and practising farmers and farm women both in non-farm training as well as in off-campus training. The National Demonstration Scheme continued its activities for the spread of newer innovations to the farming community in the district of Madurai. The Farm Advisory Councils at Coimbatore, Madurai, Kaveripattinam and Periyakulam offered suitable solutions to the various difficult problems of farmers of the State referred to by the farmers and extension workers. Training programmes were conducted to impart knowledge and skill to administratots like IAS Probationers, technical personnel of government, quasi-government and private agencies. (Table 70).

TABLE 70. Details of training programmes organised at the Main campus and other centres of the University

Sl. No. (1)	Nature of participants (2)	Organisation (3)	No. (4)	Subject of training (5)	Duration (6)	Date of starting (7)	Dept / place of training (8)
1.	Veterinarians from Sri Lanka	Commonwealth Veterinary Association	1	Clinical subject	3 weeks	May 3, 1979	Veterinary College, Madras
2.	Agricultural Field Officers	Union Bank of India	30	Agriculture	6 days	May 14	Faculty of Agriculture
3.	Vocational Teachers	—	15	Crop production	21 days	May 21 to June 10	Agronomy, Poultry
4.	Employed personnel	—	—	Poultry	—	June 7	Poultry Research Station Nandanam
5.	Subject matter specialists of West Bengal, Karnataka, Andhra pradesh, Tamil Nadu, Orissa and Madya Pradesh	—	22	Cotton production Technology	14 days	June 16	Agricultural Botany
6.	Unemployed persnnel	—	—	Poultry	2 months	July 16	Poultry Research Station Madras
7.	Deputy Agricultural Officers of Tamil Nadu	Ministry of Agriculture and Irrigation G.O.I.	—	State level Mini-kit training on Sorghum production	4 days	July 16	—
8.	TNAU staff	ISI	—	Educational utization of ISI with regard to agriculture and food products	2 days	July 18 & 19	ISI

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
9.	Deputy Agricultural Officers of Tamil Nadu	Departmen of Agriculture	—	State level Mini-kit training programme on Rice production	4 days		TNAU Main cmpus
10.	Veterinary Assistant Surgeons & Assistant Directors	Department of *Animal Husbandry*	2	Frozen Semen Techology	15 days		Department of Animal Genetics
11.	Village Level Workers	Dairy Development Corporation	6	Utilization of frozen semen	7 days		,,
12.	Deputy Agricultural Officers	Department of Agriculture	15	State level Training on Pearl Millet production	4 days		Main campus
13.	Officers (State)	—	28	Pruning and shoot cluster thinning of Mango	5 days	Aug. 2 - 6	Main campus Department of Pomology
14.	Employees	Dept. of Animal Husbandry Govt. of Pondicherry	2	Skill oriented education in poultry keeping	4 months	Nov. 1	
15.	Pre-release Defence personel	Defence Department	20	Vocationol Training prog. on poultry keeping	1 months	Nov. 1979	
16.	Rural Youth	—	10	Soil Health		—	Dept. of Soil Science and Agri. Chemistry. AC&RI., *Madurai*
17.	Asst. Professors	TNAU	35	Inservice Trg. in Learning Teaching	5 days	Dec. 24.	Dept. of English and Languge Communication

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
18.	Asst. Directors of Animal Husbandary Department	Animal Husbandry Dept.	10	Refresher and in-service training	1 days	June 1979	Veterinary College, Madras
19.	Students of Farmers Training Course, Hosur	Farmera Training Centre Hosur	21	Practical farm training on Sheep husbandry	1 day	Feb. 1980	
20.	Studente of Farmers Training course, Orathanad	FTC Orathanad	35	-do-	1 day	March 1980	

SEMINARS AND CONFERENCES

1. The Scientific Workers Conference on Animal Husbandry and Veterinary Sciences was held at the Veterinary College, Madras on April 18 and 19 under the presidentship of Thiru A. Venkataraman I. A. S., the Vice-Chancellor. The Scientists of the University and Researchers and other officers of the Department of Animal Husbandry, Tamil Nadu Dairy Development Corporation, TAPCO participated in the deliberations.

2. The All India Co-ordinated Rice Workshop was held at TNAU between 5-9, April, 1979. Dr. Sukdev Singh, Deputy Director General (Commercial Crops), ICAR delivered the Key Note Address. The four day workshop was attended by 200 delegates from all over India and abroad. Notable International Scientists viz. Dr. G. Khush, IRRI, Dr. Mathew Dagg, Dr. H. E. Kauffman and P. Crill of Ford Foundation and Dr. John A Lowe from WARAD and Drs. R. R. Sharma and R. Shah of Nepal attended the workshop.

3. The workshop on "Water Resource Management for Agriculture in Bhavani River Basin" was inaugurated by Thiru A. Venkataraman, I.A.S., the Vice-Chancellor on April 21, 1979 at the main campus. The workshop was attended by Officers and Engineers of the Irrigation, Agriculture and Ground Water Department of the State Government in addition to the Scientists of the University.

4. The First Scientific Workers Conference of Fisheries was held on May 11 at Fisheries College, Tuticorin. The Vice-Chancellor Thiru A. Venkataraman, I.A.S., inagurated the conference. Scientists from Tamil Nadu Fisheries Department, Central Marine Fisheries Research Institute, (ICAR), Exploratory Fisheries Project (Government of India) and the staff of Fisheries College participated and discussed the various on going as well as future research projects.

5. The ninth annual workshop of the All India Co-ordinated Soil Test Crop Response Correlation Project was held at Agricultural College and Research Institute, Madurai from May 21 to 23. Dr. N.S. Randhava, Deputy Director General, ICAR, New Delhi presided over the inaugural session. Dr. A. Mariakulandai, former Principal, AC&RI., Madurai delivered the Key Note Address.

6. A Seminar on "Rehabilitation of Hill Banana" was conducted at Horticultural Research Station, Thadiyankudisai on April 27. Thiru A. Venkataraman, I.A.S., Vice-Chancellor presided and inaugurated the Seminar. About 130 planters from Lower Palneys and Sirumalai Hill Regions participated. An exhibition highlighting the research achievements in the control of bunchy top disease was arrnaged. The labour saving devices developed for controlling the disease vector were demonstrated.

7. A Seminar on ' Dryland Agriculture" was conducted by the Department of Agronomy on June 18. Thiru A. Venkataraman, I.A.S., Vice-Chanclior inaugurated the Seminar and 19 papers were presented by the Scientists of the University. Dr. S. Govindaswamy, Project Co-ordinator (ORP), Hyderabad partrcipated in the Seminar.

8. The Workshop on Cereal Harvesters was orgnanized at Coimbatore from July 3-6 by the Central Institute of Agricultural Engineering, Bhopal (India). The workshop was attended by Principal investigators from India, Indonesia, Iran. Pakistan, Philippines, Thailand and Republic of South Korea. Dr. N. S. Randhawa, Deputy Director General, ICAR, New Delhi delivered the Inaugural Address.

9. A workshop on Furturology on use of chemicals in Agriculture with particular reference to future trends in Pest Control" sponsored by tee Futurology Panel of the National Council for Science & Technology (Department of Science and Technology, Government of India) and the Madras Chapter of Indian Institute of Mananement was organised by the Institute for Techno-Economic Studies, Madras and the Department of Agricultural Entomology, TNAU., Coimbatore at the University campus from August 30 to September 1.

10. A State level Workshop on Microbial Inoculants was held on September 21 under the Chairmanship of Dr. P. Chandrasekaran, Dean (Agri.). Officers from the Department of Agriculture, Tamil Nadu and staff members from University, Post graduate Centre, Coimbatore and Parasakthi College for Women, Courtallum attended the workshop. A total number of 50 participants attended.

11. The Hon'ble Minister for Agriculture and Irrigation and Pro-Chancellor, TNAU, Thiru P. Kulandaivelu inaugurated the Seminar-cum-Lab to Land Programme at Ayyankottai Village of Madurai District on December 1. More than thousand farmers participated in the above function, discussed their problems with the Specialists and got their doubts clarified.

12. A Seminar on Soil organic matter and Soil fertility was held at Coimbatore Campus on Dec. 20 & 21, 1979. Scientists from Agrl. Universities of Karnataka, Kerala and Andra Pradesh participated besides Tamil Nadu. The need to undertake Inter-University collaborative research programmes on organic matter content of soils to enhance the scientific use of all soils was emphasized.

13. The III Annual symposium of the Indian Society for Veterinary Surgery was held at Veterinary College. Madras in December, '79 Seventy four delegates from other states participated in the deliberations. The interesting feature was demonstration of cardiac by-pass, acupuncture, and electronecrosis techniques.

14. Seminar on Agro-based Industries was organized jointly by Agricultural College and Research Institute, Madurai in collnboration with Madurai Productivity Council.

FARM ADVISORY COUNCIL

The Farm Advisory Councils at Coimbatore, Madurai, Periyakulam and Kaveripattinam solved the following problems which have been brought either directly by farmers or through the State Department of Agriculture.

1. Sigatoka leaf spot and wilt in banana
2. Drainage methods to banana cultivation
3. Alternaria leafspot, leaf curl in tomato
4. Nemotode incidence in grapevine
5. Prodenia incidence in cotton
6. Physiological disorder in chillies
7. Maintenance of coconut gardens
8. Eradication of weeds by integrated control programme in a Government farm at Devakottai
9. Cropping pattern to a newly acquired area
10. Layout of orchards and flower gardens
11. Wilt and prodenia in betelvine crop
12. Manuring of orchard crops aad coconut plantations
13. Irregular flowering in chillies
14. Root grub damage in guava

FARMERS' TRAINING CENTRES

The training programmes and other activities of Farmers' Training Centre, Coimbatore, Madurai, Hosur and Orathanad and Extension Education Centre at Cashew Research Station, Vridhachalam and Research Centre at Kovilpatti are furuished below :

(i) **Institutional training camps :** The Farmers' Training Centre, Coimbatore conducted 20 institutional training camps in 20 blocks, 10 each for men and women farmers benefitting 247 men and 270 women farmers. The Farmers' Training Centre, Madurai conducted 10 institutional training camps to men farmers and 10 to the women farmers at 20 blocks of 4 day duration each and trained 224 men and 251 women farmers.

(ii) **Peripatetic training camps :** Seventy eight production-cum-demonstration camps for men and 22 for women involving 1843 men and 736 women farmers were conducted in the farmers' field by Farmers' Training Centre, Coimbatore. Sixty six one day production cum demonstration camps were conducted by Farmers' Training Centre. Madurai in farmers field with special emphasis for Tamil Nadu Agricultural University findings on field crops, agronomy and

plant protection measurers. A total of 1297 participants were benefited. Another 10 production-oriented demonstrations were conducted to 251 women farmers on nutrition aspect.

(iii) **Farmers discussion groups**: During the year, 45 men groups, and 23 women groups were newly formed in the jurisdiction of Farmers' Training Centre, Coimbatore and 330 men groups and 113 women groups were effectively functioning in villages. At Madurai Unit 200 men groups and 100 women groups were funtioning effectively as voluntary organisations at village level.

(iv) **Seminars and village meetings**: The staff of Farmers' Training Centre, Coimbatore participated in 4 village seminars conducted by the voluntary agencies. The Farmers' Training Centre, Madurai partiaipated in 3 village seminars and conducted 20 village night meetings and screened film shows during such meetings.

(v) **Adult education programme**: The Farmers' Training Centre, Madurai conducted a field oriented training programme to 64 trainees of Adult Education Programme at Tirunagar.

(vi) **Information support**: The Farmes' Training Centre, Coimbatore answered a total of 1162 questions in 350 letters. The number of letters and questions received by the Farmers' Training Centre and passed on to All India Radio are 2035 and 12,253 respectively. The Faimers' Training Centre, Madurai published 'Ulavar Madal' for dissemination of latest technology to Farmers' Discussion Groups members and convenors and through them to other farmers. It published 25 technical messages in various news papers and sent 23 technical messages to All India Radio for broadcasting

(vii) **Field campaigns with studeuts**: B.Sc. (Ag.) students numbering 150 were involved by Farmers' Training Centre, Ccimbatore in organising rat eradication campaign. Seedlings were also planted by the students. The Farmers' Training Centre, Madurai organised one rat eradication campaign at Poolampatti.

(vii) **Convenors' training**: The Farmers' Training Centre, Coimbatore conducted 5 convenors' training camps involving 150 convenors of Farmers Discussion Groups. A two day training was organised at Agricultural College and Research Institue, Madurai to 77 convenors of Madurai district. All the latest technologies were explained by the various specialists.

(ix) **Home Science demonstrations**: Ten Home Science demonstrations were conducted by Farmers' Training Centre, Coimbatore. Tomato ketchup and squashes from grapes, pineapple, orange, lemon and mango wera prepared. Jam preparation from apple and mixed fruits was also demonstrated benefitting 270 women folks.

(x) **Other training/activities**

(a) **Pre-season (Kharif) training** : Deputy Agricultural Officers of the State Department were imparted pre-season training on the improved agricultural technologies at Bhavanisagar for one day at Farmers' Training Centre, Coimbatore. One training was arranged to 50 Deputy Agricultural Officers and District Agricultural Officers of Periyakulam and Madurai divisions on the development of blue green algae on 4-6-79 at Agricultural College and Research Institute, Madurai.

(b) **Training of farmers of SFDA/IRDP** : The small and marginal farmers sponsored by the Small Farmers Development Agency numbering 1936 from Coimbatore district were given training for 2 days in low-cost technology at the Coimbatore campus. Besides 2869 small and marginal farmers from Thanjavur district sponsored by the Project Officer were given training for one day.

(c) **Tours and field trips** : The Farmers' Training Centre, Madurai organised one All India Tour for 23 days. Sixty five farmets and their family members were taken to Hyderabad, Bambay, Delhi, Ludhiana, Haryana, Bhubaneswar, Cuttack, Calcutta and visited Agricultural Universities and research stations. Four field trips were arranged for farmer-trainees at Coimbatore campus.

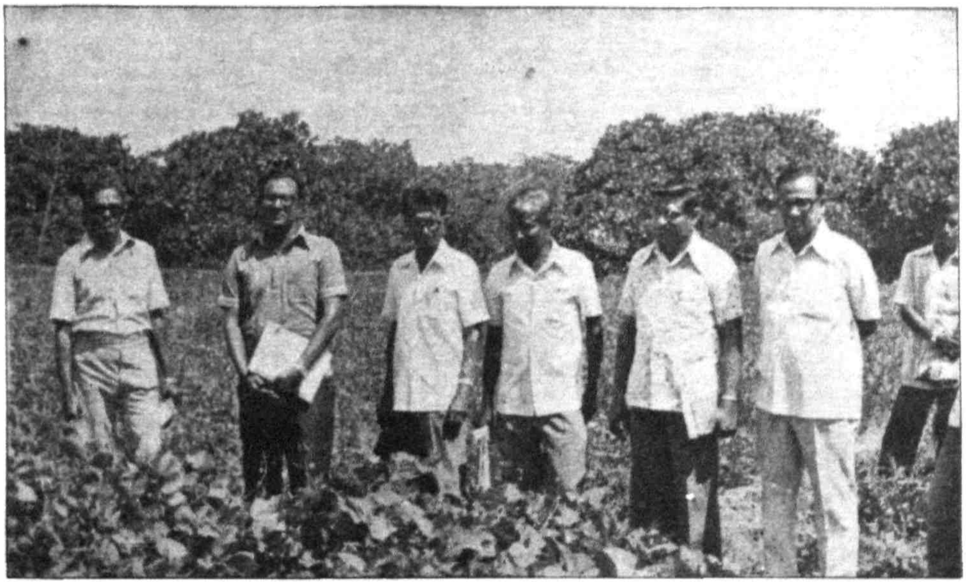
(d) **Training for rural youth** : Fifty youths of Nehru Yuvak Kendras were given training on the latest production technologies. College students numbering 85 involved in NSS were also imparted training in improved farm technologies.

(e) **Prizes for farmers discussion groups** : Ten prizes in the form of sprayers were distributed by the Farmers' Training Cetre, Madurai to the best Farmers Discussion Groups. Similarly, the Farmers' Training Centre, Coimbatore awarded prizes to the best groups.

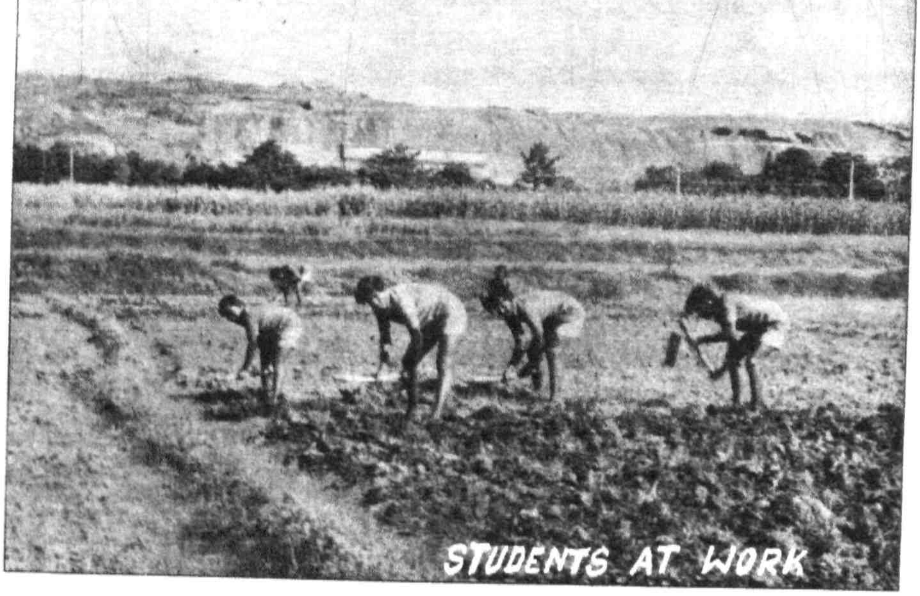
(f) **Subscription for Valarum Velanmai** : The Farmers' Training Centre, Coimbatore enrolled 1378 subscriptions for Valarum Velanmai.

(ix) **Compact Block Demonstration**: Four Compact Block Demonstrations were laid out for paddy, sorghum and bengal gram at Gobichettipalayam, Erode and Perianaickenpalayam in an area of 102 acres by Farmers' Training Centre, Coimbatore. Seven Compact Block Demonstrations were conducted, 3 under wetland system, 3 under dryland system and one under gardenland system by Farmers' Training Centre, Madurai. All the latest technologies were demonstrated.

NSS Programme - Students in Villages



ICAR Research Review Committee Visiting Cashew Research Station, Vridhachalam


STUDENTS AT WORK

Students in the Laboratory

Lab to Land Programme

Training youths of Nehru Yuvak Kendra

(xii) **Lab to land programme** : The lab to land programme sponsored by Indian Council of Agricultural Research to commemorate with its Golden Jubilee Year is also being implemented at Tamil Nadu Agricultural University. The University has adopted 3000 families in seven centres as detailed below :

	Dry.	Wet.	Agrl. labour
1. Farmers' Training Centre, Coimbatore.	750	—	—
2. Farmers Training Centre, Madurai.	—	574	176
3. Cashew Research Station, Vridhachalam.	300	—	—
4. University Research Station, Aduthurai.	—	300	—
5. Regional Research Station, Kaveripattinam.	150	150	—
6. Krishi Vigyan Kendra, Tiruchi.	150	150	—
7. Krishi Vigyan Kendra, Pondicherry	100	150	50
	1450	1324	226

The technology transferred for dry land were : Improved high yielding varieties, top dressing, Super digest compost, broad bed system and plant protection measures and wet lands were supply of improved seeds, supply of urea and neem cake, seedling dip in Doupan and Bastan, Adequate fertilizer application and plant protection measures.

Extension Education Centre, Cashew Research Station, Vridhachalam

The Extension Education Centre at the Cashew Research Station, Vridhachalam came into operation on 7th August 1979 under the Indian Council of Agricultural Research Scheme for Intensification of Research and Training on Pulses and Oilseed Crops. The general objective of the scheme is to disseminate the dry land technology to oil seed growers.

Training of farmers on the cultivation of dry oilseed crops : Twenty four training programmes for dry land farmers were organised involving 340 farmers for training them in the use of improved variety of groundnut and its package of practices, growing of two crops in the place of single crop in dry lands by taking up bunch variety in the place of spreading variety of groundnut in *Kharif* and sesamum as second crop in *Rabi* season, growing of TMV 10 during late monsoon season and developing contact with source of knowledge by (i) subscribing to "Valarum Velanmai" (ii) registering under Farm School on All India Radio programmes (iii) visiting research stations (iv) writing querries to the specialists and (v) listening to the Farm Radio programmes.

Eighteen training programmes for irrigated land farmers involving 160 farmers were organised on seed selection, pretreatment of seeds with Captan, application of gypsum and control of pest and diseases for groundnut, intercropping of groundnut in tapioca and cultivation of Co 1 groundnut.

Demonstration and trial plots laid : Thirty method demonstrations on application of gypsum, 244 method demonstration on plant protection, one result demonstration in each with Co 1 groundnut, Co 1 safflower, TMV 4 gingelly, K 2 sunflower and SA 2 castor and three trial plots with GAUCH. 1 castor were laid out in Vridhachalam, Kummapuram, Sankarapuram, Chinnasalem, Ulundurpet, Thirunavalur and Gingee blocks.

National Demonstrations

The latest research findings of Tamil Nadu Agricultural University were demonstrated in the farmer's field in the various agro-climatic regions of the district. The main objective was doing intensive agriculture with multiple croping sequence of latest released high yielding varieties of crops by Tamil Nadu Agricultural University, using modern technologies. This enabled the farmers to realise the impact of scientific methods to achieve maximum production per unit/area in unit time. Twenty four demonstrations were conducted, of which, 21 were in Madurai Division, 2 at Dindigul and one at Kodaikanal (Periyakulam Division) Two single crop, double crop and 6 three crop sequences were demonstrated during the period.

Paddy varieties viz., Vaigai, ADT 31, were raised in the majority of plots as the first crop. A maximum yield of 8.2 t/ha was obtained in Vaigai. Other than paddy, cotton MCU 9 was grown with Co 3 black grem as intercrop. This intercropping system was newly introduced in the area (Natham) and was much appreciated. Besides cotton, T9 black gram, TMV 7 groundnut were also raised and these are still standing crops in the fields.

During the year, 50 field days covering planting, plant protection and harvest of paddy and sowing gronndnut, cotton and black gram crops were conducted after duly publicising widely through All India Radio. National Demonstration farmers have also participated in the farmer's days conducted at Agricultural College and Research Institute, Madurai. Over 1300 farmers were benefitted by this arrangement. Besides these regular demonstrations, at Kondayampatti one large scale demonstration comprising 19 farmers in an area of 26.2 acres was also laid out during the period. Co 33 and ADT 31 were the main two varieties raised in the first season. Some of the practices introduced by the scheme such as DAP application in nursery and Zn SO4 in the main field, line planting, water control, economic use of fertilizers based on soil test values and applying need based sprays were felt highly useful by these farmers.

Other Farmers' Contact Programmes

Farmers' Day : Farmers' Day were celebrated not only at academic centres but also at all the research and training centres of the University. The Farmers' Day was inaugurated and new varieties were released for cultivation on January 17, 1980. Hon. Thiru P. Kulandaivelu, Minister for Agriculture and Irrigation and Pro-Chancellor of the University inaugurated the Farmers' Day at the Main Campus and released ten varieties of Tamil Nadu Agricultural University and eight varieties of State Department of Agriculture. The varieties and the scientists responsible for the work were introduced by Thiru A. Venkataraman, IAS., Vice-Chancellor and Thiru S. A. Subramani, IAS., Director of Agriculture.

The Seventh Farmers' Day at Agricultural College and Research Institute, Madurai was inaugurated on February, 9 by Hon. Thiru P. Kulandaivelu, Minister for Agriculture and Pro-Chancellor of the University. The Heads of various Development Departments spoke on the occasion. More than 3000 farmers attended and participated in the discussions.

Similarly, the other training and research centres conducted the Farmers' Day, in an effective and useful manner.

2. **Seed Sales Depot:** The quantities of seeds distributed were as follows: Paddy - 7831 kg; Cholam - 1492 kg; Cumbu - 451 kg; Ragi - 1127 kg; Tenai - 108 kg; Pulses - 176.500 kg; Chillies - 45.830 kg; Vegetable Seeds - 155.260 kg; Papaya Co 2 - 3.330kg and Flower seeds - 3.175 kg.

3. **Enquiries answered :** Questions and enquiries received from farmers from various parts of Tamil Nadu on different aspects of Agriculture and allied fields were answered. During the year 1979-80, 1888 questions were answered directly by the Communication Centre. The questions were mostly related to cultivation aspects, soils, fertilizers, Correspondence Courses and Publications of the University.

4. **Press release and dissemination :** The news papers of local, State and national importance, journals and other mass media were utilised for dissemination of new findings to larger clients in the quickest way. The popular formats of the findings both in English and Tamil could reach the literate people first and through them to other public in a shorter time. The findings were disseminated through mass communication channels directly and through change agents indirectly.

5. **Information support to All India Radio:** Research findings were processed and redrafted in spoken form and sent to all the five All India Radio Stations of Tamil Nadu and Pondicherry for broadcast as farm news, news reel, discussion or feature programmes. More than 300 programmes were offered by

the University scientists. The forecast announcements on the incidence of crop pests and diseases were sent to All India Radio for timely broadcast at weekly intervals.

Suitable answers for the questions and problems of famers received through All India Radio were sent timely for inclusion is their broadcast. More than 2205 questions were answered through All India Radio. Various finding of the University were tape recorded and sent to All India Radio, Coimbatore for University's special programme called Vivasaya Seithi Malar to be broadcast on every Saturday. Farm school on All India Radio was one of the most popular programmes of the University organised in collaboration with All India Radio. The lessons were broadcast at weekly interval by five All India Radio Stations viz., Coimbatore, Tiruchirapalli, Tirunelveli, Madras and Pondicherry. The Veterinary College, Madras offered a few courses in collaboration with All India Radio, Madras and Pondicherry.

6. **Doordharsan Programme:** During the year under report, scientists of this Univerisity have presented fourteen different programmes. The programmes are as follows :

1. Special features of grapevine cultivation in Tamil Nadu.
2. Training and pruning methods for grapevine.
3. Manures and manuring for grapevine.
4. Grapevine cultivation in dry tracts.
5. Pruning techiques for mangos.
6. Cultivation of Jasmine varieties.
7. Jasmine concrete extraction.
8. Cotton varieties fo Tamil Nadu.
9. Insect pests on Cotton and their control.
10. Diseases of cotton and their control.
11. Importance of soil testing and crop growth.
12. Importance of micronutrients for crops.
13. Importance of good seed.
14. Collection and storing of vegetable seeds.

Ten programmes of topical interest were recorded on video tapes of Closed Circuit Television at main campus during the year. These programmes have been regularly screened to the visiting farmers, trainees and other visitors. The Closed Circuit Television unit is also used as an instructional medium to teach students of this University.

7. **University Newsletter :** The printing of monthly Tamil Nadu Agricultural Uniuersity Newsletter was increased from about 1000 copies to 2000 copies. The number of pages was increased from four to eight pages. More space was allotted for research highlights with suitable photographs and illustrations with higher order of technical excellency. Besides internal

circulations, copies were mailed to district level officers of State Development Departments all Agricultural Universities in India, Chancellor, Ministers, Secretaries, Members of Board of Management, Academic council, Research Council, Extension Education Council and other such bodies

8. **Publications of popular Tamil Journal** : The format of the popular Tamil Journal of the University - 'Valarum Velanmai' was modified based on the views of readers. Short articles, tit-bits, readers' corner, women's page. illustrations, photographs, (farmers' experiences), and such other features were inculded to make the journal more useful and attractive. The number of subscribers has been increased substantially from about 6,000 to 10,000.

9. **Central Exhibition and Museum** : Large number of farmers, general public, students and visitors from within and outside the State including VIPs visited the exhibition and museum at the main campus as well as the exhibitions at all research and training centres of the University.

10. **Artist and photography section** : The Artist and photography sections attached with the Communication Centre prepared and supplied large number of posters, charts, photographs, blowups, colour film slides etc to various Departments of the University and helped in better conduct of classes, exhibitions, seminars, symposium, workshop and the like.

11. **Correspondence Course**: The Correspondence Courses were further intensified by the addition of two new courses. The courses viz. (1) Turmeric cultivation (2) Grapevine cultivation were offered for the first time. The details of the courses offered and number of participants enrolled are given below.

Name of the Course	Period From to	No. of participants enrolled
Dairying	April-June 1979	86
Banana cultivatiog	April-June 1979	39
Cotton cultivation	July-Sept. 1979	42
Turmeric cultivation	July-Sept. 1979	51
Sericulture	Oct.-Dec. 1979	116
Sugarcane cultivation	Oct.-Dec. 1979	81
Modern Poultry farming	Jan.-Mar. 1980	95
Grapevine cultivation	Jan.-Mar. 1980	24
	Total	534

Contact Programme : After the completion of six lessons in each course, the contact programme was organised at the main campus for a period

EXPENDITURE

		(Rs. in lakhs)
1.	University Offices	17 3
2.	Estate Office	30.15
3.	Capital works	20.04
4.	Agricultural College and Research Institute, Coimbatore	101.99
5.	College of Agricultural Engineering, Coimbatore	13 45
6.	Basic Sciences and Humanities, Coimbatore	20 16
7.	Agricultural College snd Research Institute, Madurai	50.62
8.	Kumaraperumal Farm Science Centre, Trichy	4.96
9.	Research Stations	73 49
10.	ICAR Schemes including Development Grant	157.15
11.	Outside Agencies	6.81
12.	Foreign Agencies	6 08
13.	Govèrnment of India Schemes	7.56
14.	Veterinary College and Research Centres	170 64
15,	Fisheries College, Tuticorin	29.85
16.	Loans and Advances	21.68
17.	Pension Fund	12.00
18.	National Service Scheme	0.43
	TOTAL	744.09

Closing Balance as on 31-3-80 : (866.30—744.09) = 122.21 lakhs.

The Finance Committee has to consider the proposals for the Revised Estimate for 1979-80 and Budget Estimate for 1980-81 of the Tamil Nadu Agricultural University and recommended the Estimate to the Board of Management. The annual audited accounts for the year 1978-79 has also to be considered by the Board of Management.

Outside Agencies Contribution during 79-80 : The following outside Agencies came forward to contribute funds to carry out the research as indicated against each

1	United States PL 480 Research Project	—	1. Schme for Solar Energy Utilisation Programme
			2. Scheme for Soil Conservation Measures for dry land soil loss equation
2	M/s Sandoz India Ltd., Coimbatore	—	Scheme for testing of SAN 197, I 50 EC against stored grain pests
3	T. Stanes and Co Ltd.	—	Scheme for research on incorporation of Micronutrients in NPK fertilizers for Cardamum

Scholarship : The scholarships offered by the following organisations were accepted.

	Name of the Donor	Amount	Purpose
1.	Messrs Alkali & Chemical Corporation of India Ltd , Madras	Rs. 10,000/-	Scholarship to M.Sc. (Ag.) students in Agrl. Entomology
2.	Messrs Sandoz India Ltd., Bombay	Rs. 10,000/-	- do -
3.	Messrs. Hoechst Pharmaecuticals Ltd., Bombay	Rs. 10,000/-	- do -
4.	Messrs. Pyrites and Phosphates Chemicals Ltd., Dehra Dun	Rs. 6,590/-	- do - in Soil Science and Agrl. Chemistry

Prizes and Medals : The following endowment was created for institutions during 1979-80.

Name of the Donor	Amount	Purpose
M/s. R. Ananthakrishnan' Madras	Rs. 10,000/-	For award of a medal to the best M.V.Sc. student in the subject 'Animal Genetics'

Grant-in-aid by the Tamil Nadu Agricultural University : Grants or subscriptions were paid to the following Institutions during 1979 - 80.

		Rs.
1.	The Fertilizer Association of India, New Delhi	1,000/
2.	Association of Indian Universities, New Delhi	5,000/-
3.	Inter University Sports Board, New Delhi	1,250/-
4.	Indian Agrl. Universities Association, New Delhi	3,000/-
5.	The Madras Agrl. Students Union, Tamil Nadu Agrl. University Campus, Coimbatore	7,000/-
6.	Uzhavar Thunaivan	3,000/-
7.	Students Club of Fisheries College	4,000/-
8.	Matching grant to the Tamil Nadu Agrl. University Staff Club, Coimbatore	5,000/-

University Budget Estimate for 1980 - 81 : Annual financial estimates of Tamil Nadu Agricultural University has been approved by the Finance Committee/Board of Management for a gross appropriation of Rs. 847.67 lakhs (including I.C.A.R., G O.I., and other agencies Scheme).

A sum of Rs. 597.00 lakhs is expected as grant from the State Government to the University for the year 1980-81 for implementing various Education and Research Programmes and also extention works. Grants from ICAR will be about Rs. 141.26 lakhs including ICAR Development grant. Grant of Rs. 22.41 lakhs is expected from the Government of India and other Agencies. Other University receipts will be in the order of Rs. 65.00 lakhs approximately.

Audit: The audit certificates for 1977-78 have been sent to the ICAR and G.O.I. for almost all the schemes sponsored by them. The audit of General Funds accounts of the University upto 1978-79 have been completed. The General result of the audit is satisfactory.

APPENDIX I

IMPORTANT VISITORS TO THE TAMIL NADU AGRICULTURAL UNIVERSITY

Coimbatore Campus

Mr. Yashwant Trivedi, Lokseva Mahavidyalaya Sansra Bhavanagar, Gujarat.

Selvi. Banu Devi Panday, Mushroom Specialist, Agricultural Department, Nepal.

Mr. T. S. Gopi, Manager, Kerala Agro. Machine Corporation, Alwaye, Kerala.

Mr. Yeoung Kil Cho, Agrl. Engineer, Institute of Agricultural Engineering and Utilization, Korea

Mr. Hussen Martaperden, Head, Department of Agrl. Engineering, Indonesia.

Mr. V. A. P. Naik, Indian Institute of Management, Bangalore.

Mr. R. K. Bansal, ICRISAT, Hyderabad.

Mr. M. M. Pandey, CIAE, Bhopal.

Mr. K. L. Magendra, CIAE, Bhopal.

Mr. Felimar M. Torrizo University of the Phillippines at Los Banos, Phillippines.

Mr. M. D. Singh, Scientist, ICAR Research Complex, Shillong, Maghalaya, India.

Mr. Jai Singh, Head of Division, Agrl. Engineering, IFFRI, Jhansi.

Mr Julee L. Tippayaruk, Thailand.

Mr. M. Charunpong. Thailand

Mr. G. D. Hill, Licoln College, Caterbuoy, New Zealand.

Mr. Roberta M. Hill, Licoln College, Caterbuoy, New Zealand.

Mr. & Mrs. SL. Krases and G. V. Jissira, Colombo, Sri Lanka.

Mr. G K. Nanda, Scientist, Central Tube crops Research Institute, Trivandrum.

Prof. Thomas Thelly, St. Thomas College, Palai, Kerala.

Mr. Gustan Boklin, Swedish Agrl. University, Uppsala, Sweeden.

Mr. E. Jac Jime, Lecturer. St. Thomas College, Trichur.

Prof. Annamma Thomas, Head of Botany, St. Joseph College, Alleppay.

Mr. Thomas Niblock, Davidson College, North Carolina, USA.

Mr. Mector Wells, Reading University, England.

Mr. Jack Bram Kamp, 1774, N. Sierra Bonnita, Pasadena - C. A. USA.

Thiru. A. M. Kasiviswanathan, Probation Dy. Collector, Trichy.

Thiru. K. Ramamoorthy, Probatian Dy. Collector,

Thiru. S. Kannan, Probation Dy. Collector, Vellore.

Thiru. M. R. Mohan, Probation Dy. Collector, Coimbatore.

Thiru. S. Suriyan, Probation Dy. Collector, Thanjavur.

Thiru. C. Muthukumaraswamy, Probation Dy. Collector, Madurai.

Miss. M. P. Nirmala, Probation Dy. Collector, Chingleput.

D. Brian Moss, School of Environmental Science, University of East Angolia, Norwich, U. K.

Thiru. Om Kumar, IAS, Collector, Chingleput.

Selvi. Leela Pattamma. College of Agri., UAS., Bangalore.

Thiru. R. K. Sekar, Lecturer, Mech. Engg. CAET., BBSR.

Mr. Mani Singh, Project Co-ordinator, FAO UNDP Mushroom Project, Himachal Pradesh.

Thiru. G. Srinivasan, Central Bank of India.

Mr. A. M. Hebbar, Lecturer, Manipal College, Udupi.

Mr. V. N. Bhat and Party, Mahaveer College, Moodibidri, South Kanera.

Mr. P. I. Mathew and Party, Indian Airlines, Coimbatore.

Mr. Ooumen Jacob, Professor, Catholic College, Pathamuthilla, Kerala.

Prof. K Rajappan, Department of Botany, University College, Trivandrum.

Thiru. S. P. Murugappan, Assistant Professor. SCERT., Madras.

Mr. Ram C. Malhotra, Kailash Colony, New Delhi.

Prof. K. Narayana Pillai, Botany Department, University College, Trivandrum.

Mr. Net Ram, IAS, Probationer LBSNAA, Mussoorie (U P.)

Mr. B. Ranganath, Administrative Officer, Syndicate Bank, Udipi.

Mr. R W. Michelmore, Botany Department, Cambridge University, England.

Mr. K. S Buttchar, Dy. Director Panchayat, Punjab.

Mr. V. Ram Rao, Village Development Officer (T), Chittoor District, Andhra.

Dr D. Dale, Associate Professor, Kerala Agrl. University, Vellayani.

Dr. R. S. Aiyer, Professor of Agricultural Chemistry, Kerala Agricultural University, Trivandrum.

Dr. H. Bruchhols, Chief Agronomist, VEE Kombinat Kali, Erburt, GDR.

Dr. W. O. Envoezor, Professor of Soil Science, University of Nigeris, Nigeria.

Dr. R. P. Gupta, Project Co ordinator, Indian Agricultural Research Institute, New Delhi.

Dr. M. M. Koshi, Co-ordinator (Research), College of Agriculture, Trivandrum.

Dr. P. Krishnamoorthy, Chemistry Radiotracer Laboratory, Andhra Pradesh Agricultural University, Bapatla, Andhra Pradesh.

Dr. Kulkarni, Associate Co-ordinator, Water Management Scheme, Dharwar.

Dr. R. L. Narasimhan, Professor of Social Science, Andhra Pradesh Agricultural University, Hyderabad.

Dr. N. Panda, Professor of Soil Science, Orissa University of Agriculture and Technology, Bhubaneswar.

Dr. Y. M. Rao, Soil Physist, I.A.R.I., New Delhi.

Dr. T. Seshagiri Rao, Professor of Soil Science, College of Agriculture, Dharwar.

Dr. M. Velayutham, Project Co-ordinator, STCR Scheme, Hyderabad.

Mr. Gerald Rixhon, Fellowship Officer, ADC, Bangkok.

Mrs. Barbara Hariss and her associate

Dr. Delane Welsch of University of Minnesota, USA.

Dr. John Day, USAID, USA.

Miss. Juliet Gayton, Rural Development Officer, British Council Office in London

Dr. I. V. Parthasarathy, Associate Professor, Department of Economics, Agricultural College, Hyderabad.

Mr. Tsuyoshi Nara, Head, Professor of Department of Indian Studies, Institute for the Study of Lauguages and Culture of Asia and Africa, Tokyo University of Foreign Studies.

Dr. Ronald A. Oliveria of Oregon State University, USA.

Dr. Ian R. Smith, Senior Scientist, Kasetsart University.

Dr. Dharm Narain; Dr. Peter Hasell and Dr. Christopher L. Delcado of International Food Policy Research Institute, USA.

Dr. T. F. Kunimova, Institute of Microbiology, Moscow, U.S.S.R.

Dr. (Mrs.) Sorokina, Institute of Microbiology, Moscow, U.S.S.R

Professor L. S. Cobley, UNESCO, Paris.

Dr. H. K. F. Hoffman, FAO, Rome.

Thiru. O. P. Bhatnagar, Scientist, ICAR, New Delhi.

Thiru. V. Kumar, Administration Officer, ICAR, New Delhi.

Dr. P. N. Nandi, Director, PD & AC Research Laboratory, Calcutta.

Dr. M. Lakshmanan, Professor of Microbiology, Madurai University, Madurai.

Dr. R. B. Patil, Director of Instructions (Agri), Dharwar, Karnataka.

Dr. M. S. Subba Rao, Scientist, CFTRI, Mysore.

Dr. R. D. Nanjaiah, Director, Institute of Animal Health and Veterinary Biologicals, Bangalore.

Dr. N. N. Prasad, Professor of Microbiology, Annamalai University, Annamalainagar.

Dr. R. Ramabadran, Department of Microbiology, Annamalai University, Annamalainagar.

Thiru. R. Narayanaswamy, Department of Microbiology, Annamalai University, Annamalainagar.

Thiru. K. S. Nair, Agricultural Chemist, Madras.

Dr. (Mrs.) R. Kasthuri Bai, Sri Parasakthi College for Women, Courtallam.

Thiru. M. M. Malik, Assistant Soil Chemist, Cuddalore.

Thiru. S. Sreenivasan, Assistant Plant Pathologist, PES, Aduthurai.

Thiru. P. Ekambaram, Deputy Agriculture Officer, Cuddalore.

Dr. T. Sankaran, Director, CIBC, Bangalore.

Dr. P. Channabasavanna, Professor and Head of the Department of Agricultural Entomology, U.A.S., Bangalore.

Dr. T. S. Thondadarya, Professor and Head, Department of Agricultural Entomology, U A S., Dharwar Campus.

Dr. J. D. Mathews, Professor of Forestry, University of Aberdeen.

Dr. S Kedarnath, Forest Geneticist and Director of Biological Research, Forest Research Institute and Colleges, Dehra Dun.

Thiru. S Kondas, I.F.S., State Silviculturist, Madurai.

Thiru. K. Shamuganathan, I F.S., Principal, Southern Forest Rangers College and Head of Biological Research, Forest Research Centre, Coimbatore-2.

Thiru. B. K. C. Rajan, I. F. S. (Retd.)., Head of the Division of Farm Forestry, University of Agricultural Sciences, Bangalore.

Dr. V. M. Naidu, Professor and Head of the Department of Botany, S. V. University, Tirupathi.

Mr. Sundaram, Director, Cardamom Board, Cochin

Mr. Shanmuganathan, Deputy Director, Cardamom Board, Cochin.

Dr. Varisai Mohammed, Retd Director of Research (Agri), Coimbatore.

Mr. S. N. Ramaswamy, Retd Chief Forest Officer, Seshasayee Paper and Boards Ltd., Erode.

Mr. P. K. Ponnnswamy, I.F.S., Deputy Conservator of Forests (Genetics) Coimbatore.

Mr. Krishnamurthi, Research Officer, Soil Science, Tamil Nadu Forest Department, Coimbatore.

Mr. C. S. Cariappa, Forest Liason Officer, Seshasayee Paper and Boards Ltd., Pallipalayam, Erode.

Miss. C Saradakumari, Assistant Research Officer, Seshasayee Paper and Boards Ltd., Pallipalayam, Erode.

Thiru. K. Balasundaram, Deputy Conservator of Forests, Forest Vegetation and Soil Survey, Coimbatore.

Dr. Prasad, I.F.S., Senior Research Officer, Forest Vegetation and Soil Survey, Coimbatore.

Mr. S. K. Sharma, I.F S., Conservator of Forests and Co-ordinator, Forest Vegetation and Soil Survey, Forest Research Institute and Colleges, Dehra Dun.

Thiru K. R. Rajagopalan, I.F S., Instructor, Southern Forest Rangers College, Coimbatore.

Thiru Ram Mohan, I.F.S., Logging Expert, F.A.O., Project, Bangalore.

Thiru V. Ravindranathan, General Manager, Seshasayee Paper and Boards Ltd., Pallipalayam, Erode.

Thiru C. Krishnamachari, Chief Chemist, Seshasayee Paper and Boards Ltd., Pallipalayam, Erode

Mr. N. J. Joshi, I.F.S , Deputy Inspector General of Forests (S. P.) Ministry of agriculture, G.O.I., New Delhi.

Mr. Madan Gopal, I. F. S., Co-ordinator, Indo-Danish project on Seed Procurement and Tree Improvement, Hyderabad.

Dr. Bagchie, Senior Research Officer, Indo-Danish Project on Seed Procurement and Tree Improvement, Coimbatore.

Mr. Mohammed Hussain, I.F.S., Conservator of Forests, Working Plan Circle, Madras.

Thiru A. Soundarapandian, Forest Working Plan Officer, Coimbatore.

Thiru G Velayudham Nair, Divisional Forest Officer, Forest Resources Survey Coimbatore.

Thiru G. Kumaravelu, Senior Research Officer (Silviculture and S. S)., Southern Forest Rangers College, Coimbatore.

Thiru K- N- Subramaniam, Botanist, Southern Forest Rangers College,Coimbatore

Thiru C. Pavitran, I.F.S., (Retd.)., Forest Officer, Sesshasayee Paper and Boards Ltd., Pallipalayam, Erode.

Thiru Gangadharan, Assistant Forest Officer, Seshasayee Paper and Boards Ltd., Pallipalayam, Erode.

Dr. Mohanraj, Senior Executive Forests, Seshasayee Paper and Boards Ltd., Pallipalayam, Erode,

Thiru S. Srinivasan, Secretary, Southero India Viscose, Coimbatore.

Dr. Sten Berger FVO/UNICEF consultant from National institute of Nutrition, Poland.

Dr, Remsay Tanish, Industrial Consultant, United Kingdom.

Madurai Campus

Dr. T. Ashahira, Professor, Faculty of Agriculture, Kyot University, Kyot, Japan.

Dr. H. S. M. Chenna Basaviah, Regional Coordinator, National Demonstration Scheme.

Thirumathy Jaya Arunachalam, Member, Board of Management of Tamil Nadu Agricultural University, Coimbatore.

Dr. A. Mariakulandai, Karaikal.

Thiru D. K. Oza, I. A. S., Madras.

Mr. Ray Lecy, Adult Farm Management, Staples, Minnisota,

Dr. W. Reed, Pulse Entomoiogist' Hyderabad.

Dr. J. Riza, Univesity of Georgia, Athens, Georgia, U.S A.

Dr. G. S. Sekhon, Director, Potash Research Institute, New Delhi.

Dr. Sudha Nagerkatti, Project Coordinator, National Centre for Biological Control, Bangalore.

Prof. T. Tanaka. The Centre for South East Asian Studies, Kyote University, Kyoto.

Dr. Yadav, Project Coordinator, ICAR Scheme on Water Management.

Dr. S. Yazawa, Faculty of Agriculture, Kyoto.

Madras Campus

Mr. George W. Seifert, PRS, C.S.I.R.O., Australlia.

Thiru S. Krishnamurthy, Ministry of Agriculture, New Delhi.

Thiruvalaragal B. Renganathan, R. Nagareenkir, S. R. Sampath, N D.R I., Bangalore and Karnal

Dr R M. Acharya, Director, Central Sheep and Wool Research Institute, Avikanagar.

Dr. Balaprakasam, Professor and Head, Department of Microbiology, Madras Veterinary College, Madras

Dr. G.A. Bandey, Advisor to Government of Jammu and Kashmir, Agriculture Production, Sheep Husbandry, Jammu and Kashmir.

Dr N. K. Bhatacharya, Head, Division of Physiology and Climatology, I.V.R I., Izatnagar. (U P.).

Dr. P. N. Bhut, Head, Division of Animal Genetics and Breeding, I. V. R. I., Izatnagar.

Dr. S.D.J Bohra, Central Sheep and Wool Research Institute, Avikanagar.

Dr. I.G Ghavan, Head, Department of Animal & Dairy Science, Mahatma Phule Krishi Vidyapeeth, Rahuri, Dist Ahmednagar, Maharastra.

Dr. S.G. Chopra, Chief Scientist (AB) & Head of the Deptt, Animal Breeding, Haryana Agricultural University, Hissar.

Dr. S.G. Chopra, Scientist, Indian Council of Agricultural Research, New Delhi.

Dr. G.G. Goel, Sheep Breeding Farm, Tal. Distt. Hamirpur (H.P.)

Dr. K.S. Johar, Univ. Professor and Head, Department of Animal Breeding and Genetics, Veterinary College, Jabalbpur (M.P.).

Dr. Joshi, Scientist, S-2, All India Co-ordinated Research Project on Sheep for Mutton, Central Institute for Research on Goats, Makhdoom, P. O. Farah, Distt. Mathura. U. P.

Professor K.M. Kale, Senior Scientist, All India Co-ordinated Researah Project on Sheep Breeding, Rahuri Ahmednagar.

Dr. R. D. Katiyar, Dy. Director (Research), Department of Animal Husbandry, Government of Sikkim, Sikkim.

Dr. S.K. Kaul, Senior Scientist, Department of Animal Husbandry, Governmont of Sikkim.

Dr. B.U. Khan, Scientist (A.G & B.), CIRG, Markhdoom, Farah, Mathura. U. P.

Dr. M. L. Koul, Dy. Director (Central) Sheep Husbandry, Jammu & Kashmir Srinagar.

Dr. B. Krishnamacharyulu, Scientist, All India Co-ordinated Research Project on Sheep for Mutton, Palamaner, Chittoor, A.P.

Dr. U.S. Krishnamurthy, Professor and Head, Department of Animal Genetics, Madras Veterinary College, Madras.

Dr. B.B. Londhe, Jr. Scientist, Animal Health Production, All India Co-ordinated Research Project on Sheep Breeding.

Dr. M.D. Pandey. Professor and Head Department of Physiology, U.P. College of Veterinary Science, A.H. Mathura (U.P.).

Dr. M.M. Patel, Sr. Scientist, Livestock Research Station, Gujarat Agricultural University, Sardar Krishi Nagar, Dantiwada, Gujarat.

Dr. Patnayak, Head, Central Sheep and Wool and Research Division of Carpet wool and Karakul Pelt Production Bikaner.

Dr. Rajamani, Director of Research (Animal Science), Tamil Nadu Agricultural University, Coimbatore-3.

Dr. A.V. Rai, Professor of Animal Genetics and Breeding, Veterinary College, Hebbal, Bangalore.

Dr. V. Rathnasabapathy, Emeritus, Scientist, Madras MedicalCollege, Madras.

Dr. K.L. Sahni, Officer on Special Duty, Central Institute for Research on Goats, Makhdoom, Mathura.

Dr. N.K. Sinha, Scientist, Central Institute, for Research on Goats, Makhdoom, farah P. O. Mathura.

Dr. Gurmg, Scientist (F.V). Central Sheep and Wool Research Institute, Avikananar.

Dr. R.N. Singh, Central Sheep & Wool Research Institute, Avikanagar.

Dr. V.K. Singh, Officer-in-Charge, Southern Regional Research Centre of Central Sheep and Wool Research Institute, Mannavanur, Kodaikanal, Tamil Nadu.

Dr. O.B. Tandon, Asst. Director General, (AP&B), Indian Conncil of Agricultural Research, New Delhi.

Dr. A.T. Venugopal, Associate Professor, Department of Microbiology, Madras Veterinary College, Madras.

Professor R.W. Albrecht, World Bank Advisor, DP & AP., Ministry of Agriculture and Irrigation, Department of Rural Development, Krishi Bhavan, New Delhi.

Mr. George Seifert, Tropical Cattle Research Laboratory C.S. LRO, Australia.

Dr. N.C. Ganguli, National Dairy Research Institute, Karnal.

Thiru S. Krishnamoorthy, Deputy Commissioner (Cattle Development) Ministry of Agriculture, New Delhi.

Dr. S.M. Reddy, Bangalore Veterinary College.

Mr. Israel Berkowitz D.V.M., Small Animal Practitioner, New Jersey, U.S-A.

Mr. Charles W. Fox D.V.M., General Practitioner, Ohio State University, U.S.A.

Dr. Mervim G. Rhoades, D.V.M., Practitioner, New York City, U.S.A.

Dr. T. Gopal, Deputy Director, Serum Institute, Hebbal, Bangalore.

Dr. A. Rajan, Professor, Pathology Department, Kerala Veterinary College, Mannuthy.

Dr. Paul Gupta, Professor of Pathology, Hariyana, Agricultural University, Hissar.

Mr. Horen Jones, Managing Director, Shillong, Co-operative Marketing Society Ltd., Bara Bazar, Shillong.

Mr. Charel ES.W Rox, D V.M. Ohio State University, U S.A.

Mr. Israel Berkowitz., D.V M Ribgefield, N J., U S.A.

Mr. Mervin, G. R. Hoades - D. V M. M. P. H. N. Ye. New York. Otto. Stock Charleston, S.C. 29412, U.S.A. Quliurn, ala.

Mr. Leon, Bodie V,M.T. Moses Sase Wa. U.S,A.

Mr. Harmok C. Leonard, D.V M. Salida, Col. 81201-U.S.A.

Mr. Ray. F. Reppert, D.V.M. Penden, Nebn.

Mr. Lynam B. Nardin Monitor Wash. U.S.A.

Mr. Roger, L. Winas D.V.M. Prairia Du.Sa. Wisconsin. U.S.A.

Mr. Nell. W. Stock Ton. D.V M. Demer Galo. U.S.A.

Mrs. Roger L. Winans Prairia Du. Sac. Wisconsin. U.S.A.

Professor Bhatachatya, Department of Physiology, I.V.R.I.

Tuticorin Campus

Dr. M.W.R.N. De Silva, School of Biological Sciences, University Sciences, Malaysia. Penang, Malavsia.

Dr. B. Moss, School of Environmental Sciences, University of East Anglia, United Kingdom.

Dr. Kenneth G. Wood, Department of Biology, State University College, Fredine, New York.

Prof. Heq. Dean, Faculty of Fisheries, Agricultural University, Mymensingh, Bangladesh.

Prof. H.P.C. Shetty, Director of Instruction, Fisheries College, Mangalore.

Prof. B. K. Salian, Professor of Fishery Engineering, Fisheries College, Mangalore.

Dr. Alagar Raja, Scientist, Central Marine Fishery Research Institute, Cochin.

Thiru. Balasubramanian, Scientist, Central Institute of Fishery Technology, Cochin.

Thiru. Appoorva Ghosh, Officer, Central Inland Fisheries Research Institute, Barrackpore, West Bengal.

Thiru. T. Selvaraj, District Collector, Tirunelveli.

Thiru. C. Chellappan, Director of Fisheries, Madras.

Thiru. A. Sreenivasan, Joint Director, State Fisheries, Madras.

Thiru. K. Nagappan Nair, Officer-in-charge, CMFRI, Tuticorin.

Thiru. S. T. Chari, Joint Director, State Fisheries, Madras.

Thiru. Alagarsamy, Scientist, CMFRI, Cochin.

Prof. Selvaraj, Principal, Kamaraj College, Tuticorin.

Prof. J. A. Daniel, Professor of Zoology, V.O.C. College, Tuticorin.

Research Stations

Thiru. V. Vaikundh, I.P S., Dy. Inspector General of Police and Director of Control, Defence, Salem.

Thiru. S. Parthasarathy, I.A.S., Collector, Salem.

Thiru. K Sandanam, Deputy Mayor, Member, Housing Board, Tamil Nadu.

Thiru. A. Chelliah, Member, Housing Board, Tamil Nadu.

Thiru. K. Lakhmikanthan Bharathi, I.A.S., Collector.

Thirumathi Latikassran, I.P.S., Assistant Superintendent of Police, Salem.

Thiru. M. Thiyagarajan, I.F.S., Conservator of Forests, Salem Circle.

Thiru. P. Baskaradoss, I.F.S., District Forest Officer, Salem.

Thiru. M. Mahalingam, Horticulturist, Salem.

Thiru. M. S. Sundararaj, District Agricultural Officer (Hill Development Scheme), Salem.

Thiru. E. Hariharan, I.P.S., Deputy Inspector General of Police, Vellore.

Thiru. Dhanapalan Mosi Joint Director of Agriculture (Commercial Crops), Madras.

Thiru. A. Kailasam, Horticulturist, Ooty.

Thiru. Manikkavasagam, Deputy Director of Agriculture (Vegetables), Cuddalore.

Dr. L. R. House, ICRISAT, Hyderabad.

Dr. H. Burchhete, G. D. R.

Dr. G. S. Sehhan, Potash Research Institute. ICAR, New Delhi.

Thiru. R. Gupta, National Seeds Corporation, Coimbatore.

Dr. S. B. Hakkeri, Assistant Director General (Agronomy), ICAR, New Delhi.

Dr. W. Reed, ICRISAT, Hyderabad.

Thiru. V. Lakshmi Ratan, I.A.S., Collector, Erode.

Dr. R. K. Rajput, Project Coordinator, W.M.S. Karnal, Hariyana.

Thiru. K. Perumal, Joint Director (Oil seeds). Madras.

Thiru. C. Manimanthiri, Joint Director (Marketing), Coimbatore.

Thiru. C. T. Shanmugam, Deputy Director, Erode,

Thiru. Ramu, Deputy Director, Coimbatore.

Thiru. K. Ramaswamy, District Agricultural Officer, Gobi.

Thiru. G. Parthasarathi, District Agricultural Oficer, Gobi.

Prof. J. O. Forbes, Canadian Advisor to the Dryland Agriculture Cell, Hyderabad.

Dr. V. Balasubramanian, Assistant Project Co-ordinator (Physiology), Dryland Agriculture Cell, Hyderabad.

Dr. N. Sanghi, Senior Scientist (Plant Breeding), Dryland Agriculture Cell, Hyderabad.

Dr. S. Govindaswamy, Project Coordinator, Operational Research Project, Dryland Agriculture Cell, Hyderabad.

Thiru. A. Sankariah, Joint Director of Agriculture (Management by Objective), Madras.

Dr. J D. Matthews, Professor of Forestry, University of Aberdeen, Aberdeen.

Thiru. K. Venkatakrishnan, Conservator of Forests, Coimbatore.

Thiru. K. R. Venkatesan, Conservator of Forests, Sandal Research Centre, Bangalore.

Dr. S. Bagchi, Senior Research Officer, Indo-Danish Projects. Coimbatore.

Thiru. T. M. Appavoo, Forest Mensuration Officer, Madurai.

Thiru P. P. Soundarapandian, Forest Working Plan Officer, Coimbatore.

Thiru. Mahamood Hussain, Conservator of Forests, Working Plan and Research, Madras.

Thiru. C. Gangadharan, Asst. Forest Officer, Seshasayee Paper and Boards Ltd., Erode.

Miss. D. Sarada Kumari, Assistant Research Officer, Seshasayee Paper and Board Ltd., Erode.

Thiru. B. K. C. Rajan, Head, Department of Farm Forestry, University of Agricultural Sciences, Bangalore.

Dr. Ronold A. Oilceira, Dept. of Agrl. and Resources Econ. Oregon State University, Oregon, USA.

Thiru. P. K. Ponnuswamy, Dy. Conservator of Forests, Forest Geneticist, Coimbatore

Thiru. J, Sundarapandian, Superintending Engineer, Soil Conservation - Engineering, Coimbatore.

Thiru. V. Kumaran, Executive Engineer, Agrl. Engg., River valley Project, Mettupalayam.

Hon. Minister for Agriculture, P. Kulandaivelu.

Mr. Kishan Singh, Director, Indian Institute of Sugarcane Research, Lucknow.

Thiru. A. P. Chinnaswami, Director of Sugar, Madras.

Thiru. S. Muthu, Mayor, Madurai Corporation.

Thiru. C. V. R. Panickar, Vigilance Commissioner, Govt. of Tnmil Nadu.

Thiru. Nacalls Bouccoui, Italy.

Thiru. T. N. Ganesan, Assistant Station Director, AIR, Tirrchi.

Thiru. Mani Singh, Project Director, FAO/UNDP/ Mushroom Project, Himachal Pradesh.

Thiru. S. Pappaiyan, Member, Tamil Nadu Khadi Graft, Pattukottai.

Thiru. K. M. S. Subramaniam, Bodi.

Thiru. V. Kanagavel, Manikandam, Thiruchi Dist.

Thiru. K Natarajan, Manikandam, Thiruchi Dist.

Thiru. R. Palaniappan, Manikandam, Thiruchi Dist.

Thiru. M. Singaravelu Manikandam, Thiruchi Dist.

Thiru K. S. Venkatachaiam, Manikandam, Tiruchi Dist.

Thiru. K M Ramaswnmy Gounder, Manikandam, Tiruchi Dist.

Thiru. P. Chinnaswamy, District Manager, FCI , Thanjavur.

Thiru Deputy Director of Agriculture, Ramnad.

Thiru. S. Venkatachalam, Pattkottai.

Thiru. Sowriraj, Tiruchi.

Thiru. Kirthy Kumar, C. S. S Officer, P & T Department, Thiruchi.

Thiru. M. S. A. Abdul Razack, Madukkur, Pattukottai Tk.

Thiru. M. N. Mohamed Yusff, Madukkur, Pattukottai Tk.

Thiru. K. C. Muthukrishna Teddi, Kallar Village, Tindivanam Tk.

Thiru S. Vaidyanathan, Under Secretary of the Govt of Tamil Nadu, Madras.

Thiru. K. Rajagopalan, Kumbakonam.

Thiru. M L. Palanisamy, Kumbakonam.

Thiru. N. V. Natarajan, Contractor, Palavangudi, Koradacheri,

Thiru. T. Kanakasabai Pillai, Natta.mangalam P. O. Kattumannar koil Tk., South Arcot Dist.

Thiru. Thillai Jayakumar, Kattumannar Kotl.

Thiru. S. Baskaran, Layam, Thovalai P,O. K. K. Dist.

Thiru. M. Periyannan, Chinnaiyachatiram, Pudukkottai Dist.

Thiru. N. Ganapathy Subramanian, Mayuram.

Thiru. P. V. Parthasarathy, Madurai.

Thiru. K. S Vengu, Kottachi House, Mayuram.

Thiru. K. Sundaram Pillai, Dy. Director of Agriculture (Retd.)

Dr. K. C. Srinivastava, Sr. Horticulturist, Citrus Experiment Station, Gonicoppal.

Mr, W,P.A.R. Rajaram, Member, Board of Management and Crop Review Committee (Horticulture), Tamil Nadu Agricultural University.

Mr. W.P.A.R. Nagarajan, Member, Crop Review Committee (Horti,), Tamil Nadu Agricultural University.

Mr. R. C. Kesavamoorthy, Member, Crop Review Committee (Horti.), Tamil Nadu Agricultural University.

Rev. Fr. Peter Royappa, Planter, St. Mary's Estate, Perumbarai.

Mr. S.A.S.M. Dhanushkodi, Member, Crop Review Committee (Horti.) Virudhunagar.

Mr. W P A S.D. Dilip Kumar, Planter, Pattiveeranpatti.

Mr. M. Alagarswamy, Ex-MLA., Planter, Kodalangadu.

Mr. K. R. Nallasivam, Ex-MLA., Kodumudi.

Mr P.R.K. Pajus, Planter, Pattiveeranpatti.

Mr. T S.S. Perumalsamy, Planter, Adalur.

Mr. A.R K. Sundaram, Planter, Ayyampalayam.

Thiru. R. Pattabiraman, Dy. Director of Agriculturs, Seed Certification, Trichy.

Thiru. V. Krishnamoortey, Addl. Director of Cotton Development, Coimbatore.

Thiru. Madok and Party, Agronomist, Central Catton Institute, Nagpur.

Thiru. C. C. Alagarswamy, Dhanalakshmi and Company, Rajapalayam, Leading ryots.

Thiru. K. S. Krishnan, Progressive farmer, Srivilliputtur.

Thiru. K. Subbiah, Progressive Farmer, Doraiswamypuram, Sivakasi.

Thiru. K. Ayyaswamy, Progressive Farmer, Komundapuram.

Dr. V. Arunachalam, National Fellow (ICAR), Groundnut Project, IARI, Regional Station, Rajendranagar, Hyderabad.

Thiru. Balzor Singh, Scientist, Division of Genetics, IARI., New Delhi.

J. C. Katyal, Project Co-ordinator (Micronutrients), ICAR.

Dr. Ronald A. Oliveria, Dept. of Agri. & Resources Economics, Oregon State University, Corvallis, Oregon, USA.

Thiru. K. V. Unnikrishnan, Scientist, Division of Genetics, I.A.R.I., New Delhi.

Dr. H. Degget, Associate Director, I.D.R.C., Srilanka.

Dr. V. Arunachalam, National Fellow, ICAR, Hyderabad.

Mr. V. S. Halpe, FAO, Fellow, Sri Lanka.

Hon'ble. Thiru. D. Ramachandran, Chief Minister, Pondicherry.

Hon'ble Thiru. V M C. Sivakumar, Minister for Agriculture, Pondicherry.

Hon'ble Thirumathy Renuka Appadurai, Minister for Education, Pondicherry.

Thiru. P. V. Jaikrishnan, I A.S., Chief Secretary, Pondicherry.

Thiru Pradeep Singh, I.A S., Secretary to Government (Dev.), Pondicherry.

Dr. Bruchholu, Chief Agronomist, German Democratic Republic.

Thiru. K Sivaramakrishnan, Director of Agriculture, Pondicherry.

Thiru. Thirunavukkarasu, Director of Electricity, Pondicherry.

Thiru. G. Sreeramulu, Under Secretary (Development), Pondicherry.

Dr. Laerve, Scientist, Denmark.

Dr. Sondergard, Scientist, Denmark.

Dr. Sejeroe, Scientist, Denmark.

Dr. J. Thuljaram Rao, Regional Co-ordinator, Lab to Land Programme, Coimbatore.

Thiru. E. Duraikannu, Nehru Yuvak Kendra, Pondicherry.

Dr. K. Regunathan, Director of Animal Husbandry, pondicherry.

Thiru. Mohandass, Project Officer, S.F.D.A., Pondicherry.

Thiru. Deivasigamni, Director of Public Works Department, Pondicherry.

Thirm. Joan Kuppuswamy, Convenor, Farmers' Discussion Group, Pondicherry.

Thiru. V. Pedda Perumal, MLA., Pondicherry.

Dr. S. Ranchawa, Dy. Director General, ICAR., New Delhi.

Thiru. M. Bhaskaran, Joint Director of Agricultural, Pondicherry.

Thiru. Natarajan, Joint Directcr of Agricultural, Pondicherry.

Thiru. Mahidra Pal, Gloria Farm, Aurobindo Ashram, Pondicherry.

Thirumathy Sithra, Auobindo Ashram, Pondicherry.

Thiru. Kuppuswamy, Assistant Project Officer, S.F.D.A., Pondicherry.

Thiru. Ranganathan, Agronomist, Madras Fertilizers, Pondicherry.

Thiru. Appavu Gounder, Progressive Farmer, Pondicherry.

Thirur Srinivasan, Progressive Farmer, Pondicherry.

Thiru. Purushothama Reddiar, Progressive Farmer, Pondicherry.

Thiru. Ramaswamy, Progressive Farmer, Karaikal.

Thiru. Prakash, Progressive Farmer, Pondicherry.

Thiru. Doraisamy Reddiar, Progresive Farmer, Pondicherry.

APENDIX II

SCHEMES FINANCED BY THE INDIAN COUNCIL OF AGRICULTURAL RESEARCH AND OTHER AGENCIES

Name of the scheme	Location	Date of implementation	Total cost 1979-80
(1)	(2)	(3)	(4)
I. Financed by the I,C.A.R.			
Department of Agronomy			
1. Integrated co-ordinated scheme for studies on salinity and water management	Bhavanisagar Madurai	1.4.74	2,14.100 2.53,000
2. Co-ordinated agronomic experiments scheme-staff at headquarters	Coimbatore	1.4.74	1,25,400
3. Co-ordinared scheme for model agronomic experiments at selected centres	Bhavanisagar	1.4.74	63,400
4. Coordinated dryland agricultural research project	Kovilpatti	1.4.74	2,92,000
5. Coordinated wheat improvement project	Coimbatore	1.10.75	45,600
6. Coordinated research improvement project (Sugarcane)	Cuddalore	1.4.74	59,300
7. Scheme for research on feasibility of introducing mixed farming with a view to increase income and employment of small, medium and large scale farmers of backward areas of Tamil Nadu	Kaveripattinam Yercaud	27.3.76 1.3.76	91,800 88,100
Department of Agricultural Botany			
8. Coordinated research project on oilseeds-integrated centre at Coimbatore(combined) (i) stenghtening of research on sunflower; (ii) scheme for establishment of cytogenetical and physiological studies on groundnut; (iii) strengthening of research work on groundnut physiology and virus units; (iv) main centre for sesamum' (v) strengthening of research work on safflower and niger; (vi) work on groundnut	Coimbatore	1.4.74	6,81,500

(1)		(2)	(3)	(4)
9.	Coordinated reseatch project on oilseeds:			
	Off-season nursery project	Aliyarnagar	1.4.74	1,47,300
	Sub-Centre for groundnut	Pollachi		81,600
	Main Centre for groundnut	Tindivanam (Vriddhachalam)		2,00,000
	Castor research station	Salem		79,500
10.	Coordinated rice improvement project	Coimbatore	1.4.74	2,32,400
		Madurai		22,200
		Aduthurai		2,06,700
		Pondicherry		22,300
11.	Coordinated millet improvement project	Coimbatore	1.4.74	1,44,500
12.	Coordinated sorghum improvement project	Coimbatore		2,68,900
13.	Coordinated research project on cotton breeding and agronomy, Cotton Zonal	Coimbatore	1.4.74	2,60,900
		Srivilliputtur		2,50,400
		Kovilpatti		1,03,100
14.	Coordinated project on jute and allied fibres-Scheme to evolve superior varieties of jute, mesta, sunnhemp for cultivation in Tamil Nadu	Coimbatore	1.4.74	72,760
15.	Coordinated pulses improvement project-Scheme for improvement of pulses in Tamil Nadu	Coimbatore	1.4.74	3,52,800
		Madurai		5,03,000
16.	Scheme for production of nucleus seeds of recently developed groundnut varieties POL. 1, POL. 2 and TMV. 10	Bhavanisagar	1.6 74	19,600
		Tindivanam		20,500
17.	Coordinated coconut and arecanut development project	Veppankulam	1.4.74	1,30,200
18.	*Project on production of elite and super* elite sunflower seed	Bhavanisagar	1.12.76	5,05,500
19.	All India coordinated research project on soybean	Coimbatore	1.7.77	37,800
20.	Rice Research-Emeritus Scientist	Coimbatore		18,400

Deparpment of Forage Crops

21.	Coordinated project for research on forage crops	Coimbatore	1.4.74	1,28,400

(1)	(2)	(3)	(4)
Department of Agricultural Entomology			
22. All India Coordinated research project on nematode pests and their control	Coimbatore	1.5.77	82,200
23. Scheme on bionomics and control of the mango stemborer (*Bactocera rufomscutata*)	Coimbatore	1.10.73	27,500
24. Studies on biological control of the coconut black headed caterpillar (*Nephantis serinoba*) and studies on biological control of the apple wooly aphid	Vaniambadi Kodaikanal	1.8.76	33,500
25. Research on improvement of patchouli with reference to nematode resistance	Coimbatore	1.7.77	26 400
26. Investigations on the resistance to pesticides developed in *Heliothis armigera* and *Spodoptera litura* on crops in relation to biotype and ecology	Coimbatore	22.12.78	14,600
27. Scheme for studies on the mangonut weevil (*Sternocherus mangiferae F*) with reference to bionomics varietal incidence and control	Coimbatore	7.4.77	47,100
Department of Horticulture			
28. Coordinated vegetable improvement project	Coimbatore Kovilpatti	1.4.74	87,400 42,000
29. Scheme for intensification of research on development of roses and jasmine varieties with high essential oil contents	Coimbatore	21.6.72	1,08,000
30. Coordinated project for improvement of tuber crops (Other than Potato)	Coimbatore	1.4.74	94,500
31. Coordinated research improvement project coconut and arecanut improvement in Tamil Nadu	Coimbatore	1.4.74	32,000
32. Coordinated spices and cashenut improvement project (Minor spices)	Virddhachalam Coimbatore	1.4.74 1.4.74	92,200 58,500
33. Coordinated research project for medicinal and aromatic plants	Kodaikanal	1.4.74	2,49,700
34. Scheme for research on temperate vegetables	Coimbatore Kodaikanal	1.8.75	59,300 62,100

(1)	(2)	(3)	(4)
35. Coordinated fruit improvement project Citrus die-back scheme	Coimbatore Periakulam	1.4.74 8.8.75	3 42,100 2,60,400
36. Scheme for research on some selected fruits in semiarid areas in India	Yercaud	1.7.76	57,200
37. Scheme for demonstration of minikit trials in cashew under cashew development programme	Vridhachalam	10.9.76	
38. Improvement of *catharanthus roseus* in Tamil Nadu	Madurai	1.12.77	29,400
Department of Agricultural Engineering			
39. Coordinated scheme for research and development of production of prototype and their evaluation under different agro-climatic conditions (Zonal Reseorch and Prototype)	Coimbatore	1.4.74	4,89,300
40. Scheme for energy requirements for agricultural production programme	Coimbatore	1.4.74	97,300
41. Scheme for studies on harvest and post-harvest technology	Coimbatore	1.4.74	1,37,000
42. Project of technical cooperation between the IDRC Canada and the ICAR New Delhi on Post-harverst technology	Coimbatore	1.9.75	55,700
43. Drip irrigation scheme for water scarcity areas	Coimbatore	27.4.76	35,700
44. All India Coordinated programme on research on bio-gas technology	Coimbatore	16.5.77	76,700
45. Project on Land and Water use planning of Watersaed	Coimbotore	1.2.79	
Department of Agricultural Economics			
44. Central Sector Scheme for drought prone areas programme, agro-economic research and pasture research under the World Bank Programme for DPAP	Kovilpatti	24.10.75	46,500
47. Farm Management research for planning agricultural development in the hills of Tamil Nadu	Coonoor	1.5.76	1,19,300

(1)	(2)	(3)	(4)
48. Integraded rural development scheme for conducting a malady remedy analysis in Dharmapuri District	Coimbatore	1.5.76	
Department of Extension Education			
49. National Demonstration on major food crops	Madurai	1.4.74	90,700
50. Coordinated research programme in extension education to be undertaken under the supervision of the I.A.R.I. New Delhi	Coimbatore	1.4.77	44,100
Department of Seed Technology			
51. Scheme for research on seed technology	Coimbatore	1.6.73	77,200
52. Breeders seed production for the National Seed Project (Purchase of equipments)	Bhavanisagar		28,000
53. Studies on the production, processing and storage of seeds of fodder, forage and green manure crops	Coimbatore	1.1.79	26,700
Depgetment of Soil Science and Agricultural Chemistry			
54. Coordinated scheme for improvement of soil physical conditions to increase Agricultural production	Coimbatore	1.4.74	1,10,700
55. Coordinated programme on assessment of effects of fertilizer use and pestmanagement on changing environment under intensive cropping (long term fertilizer)	Coimbatore	1.4.74	31,400
56. Coordinated scheme of investigation of correlation of soil test with crop response	Coimbatore	1.4.74	1,5,3200
57. Coordinated scheme on micro-nutrients of soils	Coimbatore	1.4.74	2,25,700
58. Pilot project for training personnel for a cadre of self employed rural soil health care workers	Madurai	Closed	
Department of Plant Pathology			
59. Coordinated research improvement project coconut wilt diseases	Veppankulam	1.4.74	61,500

(1)	(2)	(3)	(4)
60. Scheme for evolving methods to detect bunchy top virus in banana suckers	Thadiyankudisai	27.4.74	36,400
Department of Biology			
61. Studies on interaction between the Rhizobia and pesticides applied to seed and soil	Coimbatore	Closed	
62. Investigation on pollution of soil and water-microbial degradation of pollutants	Coimbatore	26.8.77	80,300
63. Coordinating Scheme on biological nitroge fixation	Coimbatore	1.4.78	1,60,200
Department of Fisheries Science			
64. Coordinated research project on composite culture of Indian and exotic fishes and fish seed production	Tuticorin	1.10.75	57,700
65. Water recirculation systems for fish seed and prawn culture	Tuticorin	1.1.78	62,300
66. Energy and nitrogen balance in nutrition and growth of Indian major carps	Tuticorin	24.1.78	45,200
Department of Forestry			
67. Production of seedlings of tree species of economic importance for distribution to farmer and other public bodies during Vanamahotsava	Coimbatore	23.9.76	
Agricultural Polytechnic			
68. Kumaraperumal Farm Science Centre	Tiruchi	28.2.77	6,40,700
Poultry Researcn Station, Teynampet			
69. All India Coordinated Research Project on Poultry for Meat	Madras	1.4.64	6,10,000
70. Scheme on Tenderisation and processing of Poultry Meat with special emphasis on culled birds	Madras	1.3.77	67,800
71. All India Coordinated Research Project on Sheep breeding (Finewoel)	Sandynallah	24.3.74	6,96,680

(1)	(2)	(3)	(4)
Pathology			
72. Studies on the etiology and pathology of chronic Hill Haematuria in cattle in Tamil Nadu	Madras	26.8.77	95,316
73. Studies on Neoplasms of Upper respiratory tract in Bovines	Madras	26.8.77	1,12,912
74. Studies Transmissible venereal tumour in canines (Government of India, Ministry of Science and Technology)	Madras	14.7.77	1,22,620
Parasitology			
75. Studies on immunisation against tropical thelleriasis (*Theileria annulata*) in cattle in Tamil Nadu	Madras	30.8.74	1,65,550
76. Studies on the incidence, bionomics, role in the causation of disease with special reference to transmission of piroplasmosis and control of ticks of domestic stock	Madras	18.9.73	3,58,408
I. C. A. R. Scheme outside the Tamil Nadu State			
Agricultural Polytechnic	Pondicherry		6,20,000
II. Indian Council of Medical Research			
Mass culture of larvivorous fishes	Pondicherry		55,800
III. Government of India Schemes			
1. Department of Agricultural Economics			
Comprehensive scheme on cost of cultivation of principal crops	Coimbatore	1.4.74	4,11,000
2. Department of Agricultural Extension			
Farmers' Training Centre	Coimbatore	1.4.74	1,56,000
Farmers' Training Centre	Madurai	1.4.74	1,56,000

(1)	(2)	(3)	(4)
3. **Department of Agricultural Entomology**			
a) Use of native viral and fungal pathogens in pest control and their safety to benefical insects and vertebrates	Madurai	27.9.76	42,900
b) Scheme for investigations on the control of insect pest by using naturally occurring Nuclear Polyhedrosis	Coimbatore		12,200
4. **Department of Biology**			
Investigation on the rccycling of effluents from sago factories	Coimbatore	23.8.76	35,900
5. **Department of Food Technology**			
Survey for the presence of mycotoxins with special reference to Patulin etc.	Coimbatore	1.9.76	71,800
6. **Department of Forestry**			
Scheme for the genetic improvement of casuarina epuisetifolia by selection.	Tiruchy	3.10.77	64,000
Scheme for cultivation practice (Agronomy) of bamboos in forests and farms	Mettupalayam	9.11.77	93,200
7. **Department of Agricultural Engineering**			
Swedish international Development Authority Scheme for research and demonstration on soil and water management	Coimbatore	2.5.77	1,33,900
IV. **University Grants Commission Scheme**			
1. **Department of Languages**			
A comprehensive study of the linguistic treatment of message in oral and written communication in Tamil by scientists.	Coimbatore	July '77	
V. **Schemes Implemented with Financial Support from Private Agencies**			
1. M/s Hindustan Lever Ltd., Bombay Research on Patchouli	Coimbatore	Closed on 30.10.78	20,000
Scheme for Importing Natrition Education and [Demonstration of simple Food preservation techniques in villages (Inter Church service Agency)	Madras		1,36,200

(1)	(2)	(3)	(4)
2. M/s. The ICMF Cotton Development and Research Association, Bombay. Scheme for breeding early maturing, drought resistant, medium staple cotton for harsh ecological zones of Tamil Nadu.	Kaveripattinam	17.12.74	72.000
3. Dharmapuri District Development Corporation and Co-operative Sugar Mills Research on Sugarbeet	Kaveripattinam	1.9.77	18.100
4. M/s. South India Viscose, Mettupalayam M/s. Sashasayee Paper and Board Ltd., Erode. Scheme for tree improvement Programme	Coimbatore	1.6.76	1,16,000
5. M/s. Bapalal & Company, Madras Research on Coffee	Yercaud		
6. Tamil Nadu Small Scale Pesticide Manufacturers Association, Madras-8. Scheme on Testing of Pesticides with reference to the Bio-efficiency, storage studies and residues	Coimbatore & Bhavanisagar		1,97,700

VI. Assistance from the International Agencies for Research in the University

(1)	(2)	(3)	(4)
1. German Democratic Republic. Protocol arrangement for carrying out research on N-K relationship wfth certain crops under irrigation in three location in the State			

2. U.S.S.R.-Programme of scientific exchauge and scientific cooperation between Indian National Science Academy and the USSR Academy of Sciences in respect of nitrogen fixation in soil by symbiotic and non-symbiotic processes from three participating institutions Indian side including Tamil Nadu Agricultural University, Coimbatore as one and Institute of Microbiology, Mascow from Soviet side

(1)	(2)	(3)	(4)
3. International Foundation for Science, Stockholm, Sweden	Coimbatore		
a) Investigations on the inter relationship between rhizobia and forage legumes in relation to efficient nitrogen fixation and tranfer to associated fodder grasses.			14,100
b) Studies on the microbiology of idli and dosai fermentation and development of new improved products			11,000

	(1)	(2)	(3)	(4)
c)	Micorhizal Association in Tropical pines in Nilgiris			18,900
4.	International Atomic Energy Agency, Vienna			
	Effect of pesticides on the metabolic activities of micro-organisms			16,800
5.	Soil and Health Foundation Pennsylvania, U.S.A. Biofertilizers for increasing crop production			1,31,900
6.	Staff support for University Departments at Teaching human nutrition Food Technology UNICEF, New Delhi.	at Coimbatore & Madurai		36,100
	Scheme for Land and Water use Planning of water shed (U.S.A.)			57,300
	Scheme for free improvement in Eucalyptus tertecories (USA)			74,800

APPENDIX III

BOOKS AND BOOKLETS PUBLISHED DURING 1979 - 80

A. Books

English :

Learning - Teaching

Understanding Scientific English

Post Graduate Thesis Abstract 1979 - TNAU.

TNAU Research Highlights - 1979

Spices and Plantation Crops - (Guide book for 10+2)

TNAU Annual Report (English)

Tamil :

எட்டாவது ஆண்டு அறிக்கை.

பூசணக்கொல்லிகள்

நீர் நிர்வாகம்

உயிர்வேதிய மரபியல் - ஓர் அறிமுகம்

B. Booklets

English :

Cards (Centre for Agricultural and Rural Development)

Seed production

Control of crop diseases.

MDU 1 Rice

Banana cultivation

Catalogue of Agricultural implements and Machinery developed at Tamil Nadu Agricultural University.

Guidebook on vocational education on Farm Machines and Post-harvest technology.

Silvagriculture for small and marginal farmers - Tree and wood based industries.

Proceedings of the workshop on management of water resources for agriculture in Bhavani River Basin.

Parasitology-Laboratory Guide for under graduates (reprinted).

Poultry Products and Marketing.

Tamil : குழந்தைகள் உணவு

புதிய பயிர் இரகங்கள்

பயிர் நோய் தடுப்பு முறைகள்.

மண்ணின் தன்மையும் பயிர் வளர்ச்சியும்

பழமர நோய்கள்

வாழை சாகுபடி

வாழை முடிக்கொத்து நோய் - தடுப்பு முறைகள்

இறவை சிறுதானிய சாகுபடி

மா சாகுபடி

எண்ணெய் வித்துக்கள்

தென்னை சாகுபடியில் ஏற்படும் பிரச்சனைகள்

விதை உற்பத்தி

நெல் தரிசில் பயறு சாகுபடி

விவசாயிகளுக்கு எங்களுடைய புதிய வழிமுறைகளும் படைப்புகளும்

C. Journals

English : Madras Agricultural Journal - Monthly

News letter - Tamil Nadu Agricultural University - Monthly

Tamil : களஞ்சியம்

உழவர் மடல்

வளரும் வேளாண்மை (மாத இதழ்)

உழவர் துணைவன் (மாத இதழ்)

APPENDIX IV

SCIENTIFIC PAPERS PUBLISHED DURING 1979 - 80

SCHOOL OF GENETICS

1. Appadurai, R., U.S. Natarajan, T.S. Raveendran. 1978. Phenotypic stability and adaptation of certain pearl millet cultivars. *Madras agric. J.* 65: 561-66.

2. Appadurai, R., U.S Natarajan and T.S. Raveendran. 1978. Phenotypic Stability in certain varieties of Fox-Tail Millet (*Setaria italica* Beavu) *Madras agric. J.* 65:634-35.

3. Devotta, A.D., N. Natarajan, M. Vaman Bhat and A. Subramanian. 1979. MCU 9 in summer Cambodia tract of Tamil Nadu. *Madras agric. J.* 66: 273-74.

4. Natarajan. U.S., T.S. Raveendran and R. Appadurai. 1978. A path Coefficient Analysis of yield and yield component in proso millet (*Panicum miliaceum* Linn.) *Madras agric. J.* 65:430-34.

5. Natarajan, S.T., M.R. Sathiamurthy, T.K. Ramachandran and S. Thangavelu. 1979. Inheritance of testa colour in groundnut. *Madras agric. J.* 66: 215-17.

6. Palanisamy, S. and M.N. Prasad 1979. Linear Regression of hybrids on parents. *Sorghum News Letter* 22:7-8.

7. Palanisamy, S., M.N. Prasad, A.K. Fazlullah Khan, C. Surendran and K. Meenakshi, 1979. An early maturing New Sorghum Variety for Tamil Nadu. *Madras agric. J.* 66:141-45.

8. Prasad, M.N and S. Palanisamy. 1979. Line x Tester analysis of combining ability in Sorghum. *Sorghum News Letter*. 22:7.

9. Prasad, M.N., S. Palanisamy, R. Appadurai, A. K. Fazlullah Khan and C. Surendran. 1979. Co 23 - A new high yielding sorghum variety. *Madras agric J.* 66:491.

10. Rajagopalan, R. and P. Chandrasekaran. 1979. Study of chlorophyll Mutants in IR 8 Rice. *Madras agric. J.* 66:355-60.

11. Rajagopalan, R. and P. Chandrasekharan. 1979. Induced viable Mutations in IR 8 Rice. *Madras agric. J.* 66:355-60.

12. Ramachandran, T.K. and P. Madhava Menon. 1979. Pollination mechanism and inbreeding depression in niger (*Guizotia abyssinica Cass*) *Madras agric. J.* 60:449-54.

13. Ramakrishnan, A., P.V. Marappan and N. Sivasamy. 1979. Genetic divergence in horsegram. *Indian J. agric. Sci.* 49:719-23.

14. Sivaram, M.R. and M. Subramanian. 1979. A study on natural cross pollination in sunflower (*Aelianthus annuus* L.) *Madras agric. J.* 66:263.

15. Sundarapandian, G., N.M. Ramaswamy, A. Aiyemperumal, V. Mylswamy, G.A. Palaniswamy, R.S. Annappan and S. Iyemperumal. 1979. Blackgram Co 4 - An economic strain for Tamil Nadu. *Madras agric. J.* 66:421 24.

16. Sundaresan, N. and P. Chandrasekharan. 1979. The Cytomorphology of an Inter-specific hybrid in *Capsicum*. *Madras agric. J.* 66: 95-502.

17. Sundaresan, N., T.S. Raveendran M S. Thangam and V. Mylswamy. 1979 Ragi Co 11 - An early maturing high yielding strain. *Madras agric. J.* 66: 71-74.

18. Subramanian, M., N M. Ramasamy, M. Rangasamy, R. Appadurai, N. Nataraja Ratnam and B. Subbalakshmi. 1979. Co 1 - A high yielding non spiny safflower (*Carthamus tinctorius* L.) *Madras agric. J.* 66:211-14.

19. Sivaraman, M.R. and M. Balasubramanian. 1979. A study on natural cross pollination in sunflower (*Helianthus annuus* L.) *Madras agric. J.* 66:263.

20. Ramalingam, T., M.N. Nagarajan, S. Sethuraman and P. Pillayar. 1979. *Pesticides*. 13:40-44.

AGRONOMY

1. Arunachalam, L. and Y. B Morachan. 1979. Effect of NPK fertilizers on safflower under rainfed condition. *Madras agric. J.* 66:327-29.

2. Balasubramanian, A. and SP. Palaniappan 1979. Studies on nitrogen management with *Azotobactor chrococcum* in rice (IR 20). Proc. Workshop in 'Microbial inoculants' held at TNAU, Coimbatore on Sept. 21, 1979 pp. 21.

3. Balasubramanian, G., K. Sivaprakasam, R. Kulandaivelu and J. G. Robinson. 1979. Impact of sorghum earheads on the incidence of earhead bug, caterpillar, webber and mould. *Indian J. agric. Res.* 13:106-108.

4. Chandragiri, K K. and SP. Palaniappan. 1979. Studies on cropping system with sorghum. *Sorghum News Letter*. 22:44.

5. Chinnappan, K. and SP. Palaniappan. 1980. Multi-tier cropping in castor. *Indian J. agric. Sci.* 50:168-72.

6. Duraisamy Reddy, S. and SP. Palaniappan. 1979. Studies on the response of Co 2 greengram (*Pheseolus aureus* Roxb.) to phosphorus application. *Madras agric. J.* 66:305-308.

7. Gopalaswamy, N., R. Elangovan and C. Nagarajan. 1979. Effect of different spacing and methods of sowing in the yield of irrigated bunch groundnut. *Indian J. agric. Sci.* 49:637-40.

8. Helkiah, J., V. Subramanian and N.S. Loganathan. 1979. Performance of sorghum varieties to fertilizers under rainfed conditions in Dharmapuri district. *Madras agric. J.* 66:473-74.

9. Iruthayaraj, M.R. 1978. Effective rainfall, evapotranspiration and percolation in rice as influenced by different water management practices. *Indian J. agric. Res.* 12:231-36.

10. Iruthayaraj, M. R. 1979. Problems and prospects of the mechanisation in cotton production and use of defoliants, desticant and early termination. *Paper presented at Central Institute of Cotton Research, Nagpur.* in May 1979.

11. Iruthayaraj, M.R. 1980. A note on the delinted cotton seed. *Curr. Res.* 9: 10-11.

12. Iruthayaraj, M.R., V. Kunasekaran and S Sankaran. 1979. Effect of seed soaking in growth regulants on MCU 5 cotton. *Food Fmg.* and *Agric.* 10: 153-56.

13. Iruthayaraj, M. R., V. Kunasekaran, N. Balasubramanian and S. Sankaran. 1979. Effect of napthalane acetic acid (NAA) on cotton MCU 5. *Pesticides*, 13:41-43.

14. Iruthayaraj, M.R. and R. Mayilsami. 1978. A note on the defoliation of leaves in cotton MCU 4. *Turrialba*, 28 : 251-52.

15. Iruthayaraj, M.R., R Mayilsami and A. Chamy. 1979. Fertilizer cum spacing studies in hybrid cotton. *Curr. Res.* 8 : 69-71.

16. Iruthayaraj, M.R. and Y.B. Morachan. 1978. Relationship between evaporimeters and estimation of critical stages of the rice crop using different evaporimeters. *Mysore J. Agric. Sci.* 12 : 548-52.

17. Iruthayaraj, M.R., S. Sankaran and S. Chandrasekaran. 1979. A note on the effect of lihocin (CCC), agritone, microne and microfix on the growth and yield of cotton MCU 5. *Indian J. agric. Res.* 13 : 241-51.

18. Iruthayaraj, M.R. and A. Selvaraj 1979. Effect of lihocin on cotton MCU 5 *(Gossypium hirsutum L.) Curr. Res.* 8 : 13-14.

19. Iruthayaraj, M.R. and A. Selvaraj 1979. Estimation of cotton leaf area *Curr. Res.* 8 : 83-85.

20. Kanakaraj, N. and SP. Palaniappan. 1979. Ratoon management in sorghum. *Sorghum News letter*, 22 : 39-40.

21. Krishnan, J. and SP. Palaniappan. 1979. Growth analysis in sunflower. *Oil and Oilseeds J.* 31 : 17-18.

22. Krishnarajan, J., D. Sivasankaran, M. K. Ayyasamy, S. Rajaram and Y.B. Morachan. 1979. Defoliation studies in Sunflower. *Oil and Oilseeds J.* 31 : 11-13.

23. Kuganathan, A. and SP. Palaniappan. 1979. Effect of antitranspirants on growth and production of grain sorghum. *Turrialca,* 29 : 69-74.

24. Kuganathan, A. and SP. Palaniappan 1979. Effect of antitranspirants on soil and plant water status in grain sorghum. *Acta Agronomic.* 29 : 3-4.

25. Kunasekaran, V. and M.R. Iruthayaraj. 1980. It pays to intercrop in cotton. *Curr. Res.* 9 : 27-29.

26. Kulandaivelu, R. and Y.B. Morachan. 1979. Integrated weed control in field crops of Tamil Nadu. *Proc. Weed Sci. Conf.* Parbhani, India.

27. Kulandaivelu, R., N. Kempuchetty, SP. Palaniappan and Y. B. Morachan. 1979. Weather at TNAU, Coimbatore, 1978. *Madras agric. J.* 66:108-14.

28. Kulandaivelu, R., N. Kempuchetty, P. Rajendran and Y. B. Morachan. 1979. Rainfall pattern and cropping system in Kinathukadavu Block, Coimbatore district. *Madras agric. J.* 66 : 520-25.

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APPENDIX V

POPULAR ARTICLES AND JOTTINGS PUBLISHED

Sl. No.	Name of Article	Name of the Daily / Journal in which published
1.	Control of Brown Plant Hopper.	Kisan World-March79
2.	Diseases of Tubercrops	Kisan World Februrary-79 & March 79
3.	Insect pests of Coconut Palm	Kisan World - February 79 March 79
4.	Vet. Quiz.	Kisan World - February 79 March 79 and April 79
5.	Better Banana Production,	Kisan World - February 79
6.	Bark borer on Cocoa	Kisan World - March 79
7.	Threat to cotton cultivation by verticillium wilt.	Kisan World - March 79
8.	New Variety of Onion	The Hindu 7-3-79
9.	A New method of Control of Coffee green bug.	Farm & Factory - March - April 79
10.	Co 1 Groundnut	The Hindu-13-6-79
11.	Low cost technique to boost Hill Banana Production.	The Hindu- 20-6-79
12.	Bone Meal	Junior Scientist - June 79
13.	Foliar application	Kisan World - March 79
14.	P 162 - A New Monsoon Rice	Kisan World - April 79
15.	MDU 1 Brinjal	Kisan World - April 79
16.	Potash requirement for Guava	Kisan World - April 79

17.	Irrigation for Tomato	Kisan World - April 79
18.	Use of Planofix for cotton boll retention.	Kisan World - April 79
19.	Anatomy of the stifle joint in cattle.	Dairy Guide . July 79
20.	Pests of Paddy	Farmers Manual, IRD, Ramnad Dt.- 1979
21	Pests of Cotton & their control.	Farmers Manual, IRD, Ramnad Dt.
22.	Pests of Major crops and their control.	Farmers Manual
23.	Mass production of activated clay for the protection of seeds from Storage pests.	Abstract, Madurai productivity council - 1979
24.	Mass culturing of viral, fungal and bacterial pathogens for the control of crop pests.	Abstract Madurai Productivity - Council-1972
25.	Use of indegenous plant products in the control of crop pests.	Abstract, Madurai Productivity Council, 1979
26.	MDU 1 Brinjal	Kisan World - VI (4) 1979
27.	Hints to make Radio Talk effective	Reporter - July 1979
28.	Role of feed cost in profitable dairy forming	Milcow - October 1979
29.	Profitability of dairy farming and economics of sheep and goat rearing	Tamil Nadu Journal of co-operation - Vol. 71 No. 4 & 5
30.	Fatty Liver Kidney Syndrome	Poultry Advisor - July 1979
31.	Coccidiosis in Fowls	Poultry Adviser - July 1979
32.	Diseases of crop and proventi-culus in Fowls.	Poultry Adviser - July 1979
33.	Diarrhoea in Poultry	Poultry Guide - July 1979

34.	Intussception	Poultry Guide - August 1979
35.	Diseases of the intestine in fowls	Poultry Guide - August 1979
36.	Fatty Liver Kidney Syndrome	Poultry Guide - August 79
37.	Digestion and fat food stuff.	The Indian Veg. Congress. - April - June 79
38	Technology of pulse Milling- their nutritive value and utilization	The Indian Veg. Congress. - April - June 79
39.	Input Management for High Yields in Dryland Agriculture	Kisan World - August 79
40.	Short duration Fine rice Co 41	Kisan World August 79
41.	Co 3 Cowpea	Kisan World - August 79
42.	Acid Indigestion in goats.	Kisan World - August 79
43.	TNAU Marches on	Tamilarasu (English) - August 79
44.	Trunk Injection kills leaf pest.	The Hindu - August 1, 79
45.	Checking Bunchy top of Banana.	The Hindu - August 8, 79
46.	Double cropping sequence for Drylands.	MF Agro News - May - June 79
47.	New Seed varieties in Tamil - Nadu.	MF Agro News - May - June 79
48.	New Groundnut Variety - Co 1	MF Agro News - May - June 79
49.	Promising Groundnut Bunch Selection - OSN 2.	MF Agro News - May - June 79
50.	Optimum depth for planting Coconut seedlings.	MF Agro News - May - June 79
51.	Effect of Intensive Cultivation of high yielding rice varieties on soil properties.	MF Agro News - May - June 79
52.	Puduvai Ponni Rice	MF Agro News - May - June 79 Kisan World - July 79

53.	Package of Practices for Puduvai Ponni.	Kisan World - July 79
54	Dryland agriculture-response of sorghum to applied phosphate.	Kisan World - July 79
55.	Co 23 Sorghum	Kisan World - July 79
56.	Co 5 Tenai	Kisan World - July 79
57.	Performance of Bhendi seeds	Kisan World - July 79
58.	Study on crossability (Chilli)	Kisan World - July 79
59.	Water Melons	Kisan World - July 79
60.	Sugarcane varieties for early and mid season crushing.	Kisan World - July 79
61.	Time of sowing trials on cotton under dryland agriculture.	Kisan World - July 79
62.	Cotton Leaf hopper and its control.	Kisan World - July 79
63.	Management of pregnant ewes.	Kisan World - July 79
64.	Selection of feeds	Kisan World - July 79
65.	Egger Strain - for profitable production	Kisan World - July 79
66.	Technique to Boost Hill Banana	Kisan World - September 79
67.	Research in Banana	Kisan World - September 79
68.	Co 1 Safflower	Kisan World - Septemder 79
69.	Fulgorid Resistant Co 42.	Kisan World - September 79
70.	Spodoptera (Prodenia) and its control.	Kisan World - September 79
71.	Chemical control of Tea Mosquito Bug on Cashew.	Kisan World - September 79
72.	Foliar Diagnosis Laboratory	Kisan World - September 79
73.	Goat production for profit	Kisan World - September 79
74.	Additives in Poultry Feed	Kisan World - September 79

75.	Duck Incubation and Breeding.	Kisan World - September 79
76.	Fish for Mosquito control	Kisan World - September 79
77.	Doing injustice to Dryland Farmers	Indian Exp. - 7-9-1979.
78	The future for goats in India.	Livestock Advisor-August 79
79.	An Investigation of the nutritive value of straws of certain high yielding varieties of cereal crops.	Livestock Advisor-August 79
80.	Management of rabbits for Meat production.	Livestock Advisor-August 79
81.	Influence of soil moisture and added Non the yield and quality of finger millet straw.	Livestock Advisor-August 79
82.	Grow more crossandra	Kisan World - November 79
83.	Interpecies grafts in jasmine	Kisan World - November 79
84.	Onion-chilli intercropping	Kisan World - November 79
85.	Maize-Lucerne	Kisan World - November 79
86.	Research in Coconut at TNAU	Kisan World - November 79
87.	Foliar spray of urea for rainfed Cumbu	Kisan World - November 79
88.	Tea Mites	Kisan World - November 79
89.	Dormancy of Groundnut seeds.	Kisan World - November 79
90.	Package of practices for Co 11 Ragi.	Kisan World - October 79
91.	Co 22 - Cholam package of practices.	Kisan World - October 79
92.	Research in Coconut at TNAU	Kisan World - October 79
93.	Control of Groundnut Ring Mosaic disease	Kisan World - October 79
94.	Response of dry sorghum for foliar urea	Kisan World - October 79

53.	Package of Practices for Puduvai Ponni	Kisan World - July 79
54	Dryland agriculture response of sorghum to applied phosphate	Kisan World - July 79
55.	Co 23 Sorghum	Kisan World - July 79
56.	Co 5 Tenai	Kisan World - July 79
57.	Performance of Bhendi seeds	Kisan World - July 79
58.	Study on crossability (Chilli)	Kisan World - July 79
59.	Water Melons	Kisan World - July 79
60.	Sugarcane varieties for early and mid season crushing	Kisan World - July 79
61	Time of sowing trials on cotton under dryland agriculture.	Kisan World - July 79
62.	Cotton Leaf hopper and its control.	Kisan World - July 79
63.	Management of pregnant ewes.	Kisan World - July 9
64.	Selection of feeds	Kisan World - July 79
65.	Egger Strain for profitable production	Kisan World - July 79
66.	Technique to Boost Hill Banana	Kisan World - September 79
67.	Research in Banana	Kisan World - September 79
68.	Co 1 Safflower	Kisan World - Septemder 79
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87.	Foliar spray of urea for rainfed Cumbu	Kisan World - November 79
88.	Tea Mites	Kisan World - November 79
89.	Dormancy of Groundnut seeds.	Kisan World - November 79
90.	Package of practices for Co 11 Ragi.	Kisan World - October 79
91.	Co 22 - Cholam package of practices.	Kisan World - October 79
92.	Research in Coconut at TNAU	Kisan World - October 79
93.	Control of Groundnut Ring Mosaic disease	Kisan World - October 79
94.	Response of dry sorghum for foliar urea	Kisan World - October 79

95.	Bengal gram pod borer	Kisan World - October 79
96.	Red spider mite of jasmine	Kisan World - October 79
97.	Calf Management - Key for successful dairy farming	Kisan World - October 79
98.	Puduvai Ponni rice	Kisan World - July 79
99.	Package of practices for Puduvai Ponni.	Kisan World - July 79
100.	Co 23 Sorghum	Kisan World - July 79
101.	Dryland Agriculture response of sorghum to applied phosphate	Kisan World - July79
102.	Co 5 Tenai	Kisan World - July 79
103.	Performance of bhendi seeds	Kisan World - July 79
104.	Sugarcane varieties for early and midseason crushing	Kisan World - July 79
105.	Time of sowing trial on cotton under dryland agriculture.	Kisan World - July 79
106.	Selection of feeds	Kisan World - July 79
107.	Egger strain - for profitable production	Kisan World - July 79
108.	Intercropping in Turmeric	Kisan World - December 79
109.	MCU 9 Cotton	Kisan World - July 79
110.	Protecting Cashew from Pests	Kisan World - July 79
111.	Cultivation of Bellary Onion	Kisan World - July 79
112.	Radish varieties	Kisan World - July 79
113.	Co 2 Bengal gram	Kisan World - July 79
114.	A Superior Brinjal for Tamil Nadu	Intensive Agri. - Sep. 79
115.	Puduvai Ponni out yields Ponni.	Intensive Agri. - Sep. 79
116.	Fungi-their role in our daily life	The Indian Veg. Congress. - April - June 79

117.	Preservation : A profitable business agro-based cottage industries.	Tamil Nadu Journal of co-operation - November 9
118.	Sericulture	Valarum Velanmai March 79
119.	Fungi affecting food stuffs	Valarum Velanmai - March 79
120	Forage crops suited to Tamil Nadu.	
121.	Ill-effects of factory wastes.	Valarum Velanmai - March 79
122.	Trickle Irrigation	Valarum Velanmai - March 79
123.	Betelvine wilt	Valarum Velanmai - March 79
124.	Attitude of present day youth	Valarum Velanmai - March 79
125.	Groundnut Co 1 cultivation details	Valarum Velanmai - March 79
126.	Spread of infectious disease from days to human beings.	Valarum Velanmai - March 79 Kalanjiyam - March 79
127.	Coconut: Question-Answer	Valarum Velanmai - March 79
128.	Groundnut grader	Pannai Thozil - March - April 79
129.	Bullock drawn weeder	Pannai Thozil - March - April 79
130.	Container for Prawn rearing	Pannai Thozil March - April 79
131.	Rootrot of pulses	Pannai Thozil - March - April 79
132.	Controlling plant diseases	Vignana Vivasayam - April 79
133.	Sorghum Co 23	Uzhavar Nalam - Kalaukkthi Panguni
134.	PKM 1 Snakegourd	Uzhavar Nalam - Kalaukkthi Panguni Uzhavar Velanmai - May 79
135.	MDU 1 Brinjal	Uzhavar Velanmai - May 79
136.	Gobar gas slurry & Poultry feed	Mahajanam - 12-4-79
137.	Curd for health	Er Uzhavan - 14-4-79
138.	Dairy Farming Question-answer	Er Uzhavan 14.4.79
139.	Culturing Prodenia Virus	Kalanjiyam - Feb. 79

140.	Economic Water use in ashgourd	Kalanjiyam - March 79
141.	Pakage of practices for Co 3 Onion	Kalinjiyam - March 79
142.	Co 1 Chilli cultivation	Kalinjiyam - March 79
143.	Co 23 Sorghum	Uzhavarmadal - May 79
144.	Co 41 Rice Cultivation tips	Kalinjiyam - March 79 Uzhavar Madal - May 79
145.	Cultivation details of Co 42 Rice	Kalanjiyam - March 79
146.	Tips to obtain more Yield in Mullai	Kalanjiyam - April 79
147	Management Practices for MDU 1 Brinjal	Kalanjiyam - April 79
148.	Cultivation of PKM 1 Snake gourd	Kalanjiyam - April 79
149.	Cowpea Co 3 Cultivation	Kalanjiyam - April 79 Uzhavar Madal - May 79
150.	Co 2 Bengalgram	-do- -do-
151.	Safflower Co 1	Kalanjiyam - April 79 Uzhavar Madal - May 79
152.	MDU 1 Brinjal for High quality and More yield	Uzhavar Thunaivan - March 79
153.	Underground water current - An Analysis	Uzhavar Thunaivan - March 79
154.	Fish Culture in rice field	Uzhavar Thunaivan - March 79
155.	Injection for Banana	Uzhavar Thunaivan - March 79
156.	Saales in Betelvine	Uzhavar Thunaivan - March 79
157.	Agricultural Quiz	Uvhavar Thunaivan - March 79
158.	Diseases on Chilli	Uzhavar Thunaivan - March 79
159.	Flower Collection	Uzhavar Thunaivan - March 79
160.	Pig rearing	Uzhavar Thunaivan - March 79
161.	Mildew of Betelvine	Uzhavar Thunaivan - March 79

162.	Viral diseases of plants	Kalaikadir - June 79
163.	Cultivation methods of Groundnut Co 1	Kalaikadir - June 79
164.	Jathi Malli	Vignana Vivasayam - May 79
165.	New Puduvai Ponni Rice	Vignana Vivasayam - May 79 Valarum Velanmai - May 79 Kalanjiyam ErUzhavan - 26 5.79 Uzhavar Madal - May 79 Uramum Payirum-Sitharthi-Chithirai-Vaikasi
166.	Symptoms and control of crop diseases	Vignana Vivasayam - May 79 Vignana Vivasayam - August 79 Vignana Vivasaysm - Sep. 79
167	News ways of boosting cotton yield	Mahajanam - 17.5.79
168.	Cotton for prosperity	Mahajanam - 10.5.79
169.	Garlic cultivation	Er Uzhavan - 12.5.79
170.	Methods of culturing fish in farms	Er Uzhavan - 26.5.79
171.	Time and dosage of manures for higher yield in rice	Er Uzhavan - 26.5.79
172.	Mushroom-New food	Er Uzhavan - 26.5.79
173.	Preparations from Tomato	Er Uzhavan - 26.5.79
174.	Protein levels of certain rice varieties	Pannai Thozhil - May 79
175.	Fodder suited to livestocks	Pannai Thozhil - May 79
176.	Methods of softening meat	Pannai Thozhil - May 79
177.	Cane: Question - answer	Sakthi Seithi madal - Mar.-April 79
178.	Co 5 Tenai Cultivation	Uzhavar Madal - May 79
179.	Co 1 Kudiraivali	Uzhavar Madal - May 79
180.	Our targetted works of New Year	Valarum Velanmai - April 79
181.	Co 23 New sorghum	Valarum Velanmai - April 79

182.	Rearing silkworm	Valarum Velanmai - April 79
183.	Milk Production and Miclh cow population	Valarum Velanmai - April 79
184.	Horticultural Wealth of Tamil Nadu - Fruits	Valarum Velanmai - April 79
185.	Rat control	Valarum Velanmai - April 79
186.	Coconut to withstand cyclone	Valarum Velanmai - April 79
187.	Iron deficiency of Jasmine	Valarum Velanmai - April 79
188	For Farmers' attention	Valarum Velanmai - April 79
189.	Importance of soil testing	Valarum Velanmai - April 79
190	Numbering cattle for identification	Valarum Velanmai - April 79
191.	New Nitrogenous Fertilizers for rice	Valarum Velanmai - April 79
192.	Tapioca Diseases	Valarum Velanmai - April 79 Er Uzhavan - 10.11.79
193.	Coconut Question - answer	Valarum Velanmai - April 79
194.	Solar water heater	Valarum Velanmai - May 79
195.	Marketing Silk worm cocoons	Valarum Velanmai - May 79 Uramum Payirum-Sitharthi-Chithari-Vaikasi - Ani
196.	Products from Neem	Valarum Velanmai - April 79
197.	Pulses for rice fallows	Valarum Velanmai - April 79
198.	Intensive Fish rearing	Valarum Velanmai - April 78
199.	Let us have poultry	Valarum Velanmai - April 79
200.	MCU 9 Cotton - Outstanding varety for Tamil Nadu	Valarum Velanmai - April 79
201.	Poultry bronchitis	Valarum Velanmai - April 79 Kalanjiyam
202.	Dairy Farming question-answer	Valarum Velanmai - May 79
203.	Auspicious Turmeric	Kalanjiyam - May 79

204.	Farming in Tamil Nadu Yesterday, Today and Tomorrow	Valarum Velanmai - June 79
205.	Seed Planter	Valarum Velanmai - June 79
206.	Blackgram - Conventional & High yielding varieties	Valarum Velanmai - June 79
207.	Dena Nath - A short duration grass	Valarum Velanmai June 79
208.	Activated clay for seed stortage	Valarnm Velanmai - June 79
209.	Fertilizer requirement and Post-harvest changes in groundnut	Valarum Velanmai June 79
210.	Fine wooly sheep	Valarum Velanmai - June 79
211.	Clusterbean diseases	Valarum Velanmai - June 79 Er Uzhavan - 30.3.79
212.	Yield is the reward for hard work	Valarum Velanmai June 79
213.	Let us grow by intercropping	Valarum Velanmai - June 79
214.	Pest Occurence & damage in rice	Valarum Velanmai - June 79
215.	Apple cultivation in Kodai Hills	Valarum Velanmai - June 79
216.	Chilli cultivation : Question-answer	Valarum Velanmai - June 79
217.	Groundnut Cultivation	Uramum Payirum - Kalaukthi - Thai, Masi, Panguni
218.	Turmeric	Uramum Payirum - Kalaukthi - Thai, Masi, Panguni
219.	To get higher yield in chilli	Uramum Payirum - Kalaukthi - Thai, Masi, Panguni
220.	Micronutrients and Plant growth	Uramum Payirum - Kalaukthi - Thai, Masi, Pangnni
221.	Biogas	Kalanjiyam - No. 2, 79
222.	Turmeric Price	Malai Murasu - Dec. 79
223.	Bold size Jasmine	Uzhavar Thunivan - June 79
224.	Cultivation Techniques for Tube-rose	Uzhavar Thunivan - July 79

225.	New Year's Gift MDU 1 Brinjal	Dinamalar - April 79
226.	Abortion in cattle	Pannai Thozhil - Dec. 79
227.	Fish culture in Sewage water	Pannai Thozil - September 79
228.	Role of soil ameliorants	Pannai Thozil - December 79
229.	Phosphotic fertilizers suitable for dryland pulses	Pannai Thozil - December 79
230.	Important type of Cashew cultivation	Pannai Thozil - December 79 Uramum Payirum - Sitharathi Uramum Payirum - Chiterai. Uramum Payirum - Vaikasi, Ani. Er Uzhavan - 27.10.80.
231.	Diseases of Cumbu and Ragi	Pannai Thozhil - December 79
232.	All effects of Pesticides on cattle	Pannai Thozhil - December 79
233.	Chickory	Malai Murasu - 20.11.79 Vignana Vivasayam - November 79
234.	Seed Treatment	Uzhavar Madal - November 79
235.	Pests on Coconut	Uzhavar Madal - December 79
236.	Pruning grapes	Uzhavar Madal December 79
237.	They are Part	Uzhavar Thunaivan - June 79
238.	Falling Skylab	Uzhavar Thunaivan - June 79
239.	Aspirations of Agricultural graduates	Uzhavar Thunaivan - Agust 79
240.	Lab to -Paiyur	Dinamani - 13.11.79
241.	Agricultural Research Station, Paiyur	Dinamani - 3.8.79 Malai Murasu - 9.8.79
242.	Banana after Banana	Tamilarasu - 17.4.79
243.	Apt time of harvesting fodders	Tamilarasu - 16.4.79
244.	Green fodders replace concentrates	Tamilarasu - 16.4.79
245.	Wilt of Betelvine	Tamilarasu - 16.3.79
246.	Nutrients for cotton	Tamilarasu - 16.3.79
247.	Apt time of harvesting rice	Vignana Vivasayam - August 79
248.	Reducing the calving intervals	Vigaana Vivasayam - August 79 Valarum Velanmai - August 79

249.	Correct age for groundnut harvest	Vignana Vivasayam - August 79
250.	Mulches for dry black cotton soils	Vignana Vivasayam - August 79 Er Uzhavan - 1.9.79 Valarum Velanmai - November 79
251.	Can we apply More Micronutrients to crops?	Vignana vivasayam - September 79
252.	Irradiation in agriculture	Pannai Thozhil - September 79
253.	Permanent Manurial Experiments	Pannai Thozhil - September 79
254.	Intercropping in rainfed cotton	Pannai Thozhil - September 79
255.	Co 41 Rice-New One from Paddy Breeding Station, Coimqatore.	Dinamalar - 19.7.79
256.	Co 1 Tomato	Er Munai - 20 9 79
257.	Maintenance of soft wooly goats	Pannai Thozhil - July 79
258.	Profitable cattle feed	Pannai Thozhil - July 79 Valarum Velanmai - July 79
259.	Co 2 Thandukeerai	Uzhavar Uyar Velanmai. - April 79
260.	Deadly disease of cattle	Er Uzhavan - 1.9.79
261.	Nutritive food-curd	Er Uzhavan - 30.3 79
262.	Disease of Peas	Er Uzhavan - 30.3.79
263.	Plants too laugh and weep!	Er Uzhavan - 30.3.79
264.	Factory waste reclaims Alkali	Er Uzhavan - 30.3.79
265.	Methods of controlling Fulgorids	Er Uzhavan - 10.11.79
266.	Storing eggs longer	Er Uzhavan - 10.11.79
267.	Injection for coconuts	Kanchi Kooturavu - November 79
268.	Can we directly sow rice?	Kudandai Seithi - April 79
269.	Liver in Poultry feed	Kudandai Seithi - April 79
270.	Best feed for lamps	Kudandai Seithi - April 79
271.	Can we transplant cholam?	Kudandai Seithi - August 79
272.	Tips to grow cumbu	kudandai Seithi - August 79
273.	Advantages of tipping bunche type of lab-lab	Mahajanam - 30.8.79
274.	New Red gram to withstand root-rot	Mahajanam - 30.8.79

275.	Methods of cultivation of Puduvai-Ponni rice.	Uramum Payirum - Sitharthi-Chithi-rai, Vaikasi-Ani.
276.	More Yield in Mullai	Uramum Payirum - Sitharathi Chithi-rai, Vaikasi, Ani
277.	Ways of Manuring	Uramum Payirum - Sitharthi-Chithi-rai Vaikasi, Ani
278	Gingelly cultivation	Uramum Payirum - Adi, Avani Purattasi Valarum Velanmai - July 79
279.	Neem for pest control	Pannai Thozhil - November 79 Er Uzhavan - 13.10.79
280.	Komari disease of cattle	Pannai Thozhil - November 79 Er Uzhavan - 13-10 79
281.	New Groundnut for drylands.	Er Uzhavan - 13-10 79 Pannai Thozhil - November 79
282.	Intercropping	Pannai Thozhil - November 79 Er Uzhavan - 13-10-79
283.	Bacterial & Viral diseases of rice.	Pannai Thozhil - November 79 Er Uzhavan - 24 11-79
284.	Multi-tier cropping in Coconuts & Arecanuts	Pannai Thozhil - November 79 Er Uzhavan - 24-11-79
285.	Different sizes of eggs	Er Uzhavan - 26-11 79 Valarum Velanmai - October 79 Pannai Thozhil - November 79 Er Uzhavan - 24-11-79
286.	Novel Methods to preserve seeds from pests.	Er Uzhavan - 24-11-79 Pannai Thozhil - November 76
287.	New Millet varieties	Pannai Thozhil - November 79
288.	Chemical Fertilizers & water absorption capacity.	Pannai Thozhil - November 79
289.	White rust of green	Pannai Thozhil - November 79
290.	Diseases of sorghum	Pannai Thozhil - November 76
291.	Cheap method of delaying robusta ripening	Pannai Thozhil - December 79
292.	Control measures of grape diseases.	Pannai Thozhil - December 79

293.	Recent advances in agriculture	Valarum Velanmai - July 79
294.	Agricultural Marketing Department Genesis and Growth	Valarum Velanmai - July 79
295.	Organic Manures	Valarum Velanmai - July 79
296.	Earhead disease of Sorghum	Valarum Velanmai - July 79
297.	Plant Protection	Valarum Velanmai - July 79
298.	Wheat suitable for Tamil Nadu	Valarum Velanmai - July 79
299.	Weedicide in rice cultivation	Valarum Velanmai - July 79
300.	Controlling brown Plant hopper	Kisan World - March 79
301.	Foliar application of Nitrogen	Kisan World - March 79
302.	Better Banana Production	Kisan World - March 79
303.	Diseases of Tuber crops	Kisan World - March 79
304.	Bark borer on Cocoa	Kisan World - March 79
305.	Threat to cotton cultivation by verticillum wilt disease.	Kisan World - March 79
306.	Vet quiz.	Kisan World - March 79
307.	Technique to Boost Hill Banana	Kisan World - September 79
308.	Research in Banana	Kisan World - September 79
309.	Co 1 Safflower	Kisan World - September 79
310.	Spodoptera & its control	Kisan World - September 79
311.	Additives in Poultry Feed	Kisan World - September 79
312.	Duck Incubation and Brooding	Kisan World - September 79
313.	Fish - for Mosquito control	Kisan World - September 79
314.	Effect of NAA and Non MCU. 9 cotton	APAU News - December 79
315.	MCU 2 cotton	Pioneer Workers World - March - Sep. 79
316.	Co 41 for Kodai Season	Farmer's Friend - October - Dec. 79
317.	Co 42 Impressively Resistant to BPH.	Farmer's Friend - Oct.-Dec. 79 Kisan World - September 79
318.	Nematodes can reduce yield by sixty percent.	Farmers' Friend - Oct.-Dec. 79

319.	Short duration varieties of cane	Farmers' Friend - Oct.-Dec. 79
320.	Co 1 chilli High Yielding variety suitable for all areas.	Farmers' Friend - Oct.-Dec. 79
321.	Co 1 Groundnut - Bunch type that is well suited for rainfed and irrigated conditions.	Farmers' Friend - Oct.-Dec. 79
322.	New groundnut Co 1.	Coromandal News - 1979
323.	Early Rice for Multiple crop.	Coromandal News - 1979
324.	Varieties for tender coconuts	Coromandal News - 1979
325.	Horticultural Species for farm forestry-Amla.	Junior Scientist - Oct.-Nov. 79
326.	Horticultural species for farm forestry - Pomegranate	Junior Scientist - Oct.-Nov. 79
327.	Amid Indigestion in goats	Livestock Advisor - January 80
328.	Agricultural Heritage of the Tamils.	Tamilarasu - January 80
329.	Ehrlichiosis in Bovines case Reports.	Livestock Advisor - Febuary 80
330.	Drip irrigation principles and practices.	Kisan World - March 80
331.	Single fungicide to control rust and tikka of groundnut	Kisan World - March 80
332.	Fertilizer schedule for dry sorghum.	Kisan World - March 80
333.	Chemical Weed control in groundnut	Kisan World - March 80
334.	Control of Powdery Mildew in Rose	Kisan World - March 80
335.	Reddening of Leaves in cotton	Kisan World - March 80
336.	Intercropping in Turmeric	Kisan World - March 80
337.	Climatic requirements of cotton	Kisan World - March 80
338.	Economics of Forest plantations-Cashew	Kisan World - March 80
339.	One enemy - Eight crops	Kisan World - March 80

340.	Organic matter for soil productivity	Kisan World - April 80
341.	Garlic extract for insect control	Kisan World - April 80
342.	Economics of Forest-Plantations Eucalyptus & cassuarina	Kisan World April 80
343.	Shevaroy Hills suited for pine apple	Kisan World - April 80
344.	Control of cordamom stem borer	Kisan World April 80
345.	A forage legume - Vigna Marine	Kisan World - April 80
346.	Checking blister blight and red rust of Tea.	Kisan World - April 80
347.	Frozen semen has come to stay in	Tamil Arasu March
•348.	Impact of Rainfall on Plant diseases	Farm & Factory - Sep Oct. 79
349.	Profitable stage of slaughtering pigs.	Valarum Velanmai - July 79
350.	Black soil & chlorosis	Valarum Velanmai July 79
351.	Thinning plum	Valarum Valanmai - July 79
352.	Chilli, Question - answer	Valarum Valenmai July 79
353.	Extraction of oil from Sunflower	Valarum Velanmai - August 79
354.	Onion - Co 3	Valarum Velanmai - August 79
355.	Rice Farming	Valarum Velanmai - August 79
356.	New Method of Plant Propagation	Valarum Velanmai - August 79
357.	Cabbage	Valarum Velanmai - August 79
358.	Milk Production at low cost	Valarum Velanmai - August 79
359.	Multiple cropping	Valarum Velanmai - August 79
360.	Agri-Graduates in farming	Valarum Velanmni - August 79
361.	Economical Cattle feed	Valarum Velanmai - August 79
362.	Super Seedlings of Rice	Valarum Velanmai - August 79
363.	Efforts & abilities of Farming Community.	Valarum Velanmai - August 79

364.	Banana : Question - answer	Valarum Velanmai - August 79
365.	Intercrops in Casuarina	Valarum Velanmai - August 79
366	Cattle Wealth	Valarum Velanmai - Sep. 79
367.	Pathogens in seeds	Valarum Velanmai - August 79
368	Manuring & Weeding in chillies	Valarum Velanmai - August 79
369.	Progressiveness of Rural Tamil Nadu	Valarum Velanmai - August 79
370.	Group approach for extension	Valarum Velanmai - August 79
371.	Caring Poultry in rainy season	Valarum Velanmai - Augugt 79
372.	Infectious Cattle diseases affecting human beings	Valarum Velanmai - Sep. 79
373	Second crop of blackgram	Valarum Velanmai - Sep. 79
374.	Low Cost Gobar gas	Valarum Velanmai - Sep. 79
375.	Turmeric : Question - answers	Valarum Velanmai - September 79
376.	Papaya for Papain extraction in Tamil Nadu	Valarum Velanmai - October 79
377.	Mixed cropping in sugarcane	Valarum Velanmai - October 79
378.	Agricultural Education for rural women	Valarum Velanmai - October 79
379.	Crop Pests symptoms and Control measures	Er Uzhavan 8-3-1980
381.	Storing eggs longer	Er Uzhavan 8-3-1980
380.	Preservation technique for Lemon	Pannai Thozhil - Feb. 80
382.	Cultivaiton of Coffee	Valarum Velanmai - Octo. 79
383.	Short duration rice suited to Ramnad District	Valarum Velanmai - Octo. 79
384.	Co 23 Sorghum for Panguni	Valarum Velanmai - Octo. 79

385.	Delaying Robusta ripening	Valarum Velanmai - Octo 79
386.	New Achievement in Gingelly Yield	Valarum Velanmai - Oct 79
387.	Technique to boost Apple-Parlin's Beauty yield	Valarum Velanmai - Oct. 79
388.	Question - Answer : Turmeric	Valarum Velanmai - Oct. 79
389.	Agriculture in Sewage water	Valarum Velanmai Oct. 79
390.	Water Management in Israel	Valarum Velanmai - Oct 79 Valarum Velanmai - Nov 79 Seithi Madal - Feb. 80
391.	Disease Control in goats & Sheeps.	Seitei Madal Dec 79
392.	New Pesticides to kill cotton bollworms.	Valarum Valanmai Nov. 79 Valarum Velanmai Nov. 79
393.	Can We apply overdose of Micronutrients	Valarum Velanmai - Nov. 79
394.	Why should we mix correct quantity of seed chemicals	Valarum Velanmai Nov. 79
395.	Single budded Tapioca sets	Valarum Velanmai - Nov. 79
396.	Paiyur Regional Research Station	Valarum Velanmai Nov 79
397.	Know the quality of Your Irrigation water	Valarum Velanmai Nov. 79
398.	Feeds for Young calves	Valarum Velanmai Nov. 79
399.	Usefulness of SFDA	Valarum Velanmai Nov. 79
400.	Lab to Land	Valarum Velanmai Nov. 79
401.	Turmeric Cultivation:- Question-answer.	Valarum Velanmai - Nov. 79
402.	Alkali Lands and rice Cultivation	ER Uzhavan 12-4-1980
403.	Soundal - A good fodder	Pannai Thozhil - Feb. 80 Vignana Vivasayam - Feb. 80

404.	Papain Extraction technique	Vignana Vivasayam - Feb. 80
405.	Mixed Fodders	Pannai Thozhil - Feb. 80
406	Eucalyptus cultivation	Pannai Thozhil - Feb. 80 Er Uzhavan 9-2-80
407.	Pests on Cardamom	Pannai Thozhil - Feb. 80
408.	Feeding Methods of calves	Pannai Thozhil - Feb. 80
409	Rice Bran	Pannai Thozhil - Feb. 80
410.	Organic Manure & Physical Properties of soils	Pannai Thozhil - February 80
411.	Package of practices for Cocoa	Pannai Thozhil - February 80
412.	Water requirements of cotton	Pannai Thozhil - February 80
413	Bacterial culture for Pulses	Uzhavar Madal - Dec. 79 - Feb. 80
414	New Varieties of TNAU	Uznavar Madal - Dec. 79 - Feb. 80
415.	Blackgram after rice harvest	Kudanthai - Mavatta Seithi - Sep. 79
416.	Scales on Turmeric	Kudanthai - Mavatta Seithi - Sep. 79
417.	Some useful Information on ragi Planting	Kudanthai - Mavatta Seithi - Sep. 79
418.	Seasonal conditions and crop diseases	Vignana Vivasayam - Dec. 79 Pannai Thozhil - Jan. 80 Valarum Velanmai - Dec. 79
419.	Seasonal conditions and crop pests	Pannai Thozhil - Jan. 80
420	New approach for Arecanut cultivation	Pannai Thozhil - Jan. 80
421.	Sheath blight of rice	Vignana Vivasayam - Dec. 79
422.	Disease control in sorghum	Vignana Vivasayam - Dec. 79
423.	How to control onion diseases?	Er Uzhavan - 27.10.79 Vignana Vivasayam - Dec. 79
424.	Bunchy top disease of banana and its control measures	Vignana Vivasayam - Dec. 79
425.	New Viral diseases of rice	Vignana Vivasayam - Dec. 79

426.	Turmeric leafspot disease	Vignana Vivasayam - Dec. 79
427.	High Yielding Co 3 Onion	Vignana Vivasayam - Jan. 80
428.	Fruit-rot of Banana	Vignana Vivasayam - Jan. 80
429.	Role of cattle Manure in Improving Soil conditions	Vignana Vivasayam - Jan. 80
430.	Ginger - Package of practices	Vignana Vivasayam - Jan. 80
431.	Can we apply inorganic fertilizers continuously	Vignana Vivasayam - Jan. 80
432.	Protecting poultry from white diarrhoea	Vignana Vivasayam - Jan. 80
433.	Micro Nutrients of Sunflower	Er Uzhavan - 27.10.79
434.	Green Fodder and cattle	Er Uzhavan - 12.1.80
435.	Saline, alkaline soils reclamation	Er Uvhavan - 12.1.80
436.	Single buded sets on sugarcane	Er Uzhavan - 12.1.80
437.	Disease of sheeps	Er Uzhavan - 26.1.80
438.	Poultry Rearing	Er Uzhavan - 9.2.80
439.	Diseases of Groundnut	Er Uzhavan - 9.2.80
440.	Even here we have oil wealth	Er Uzhavan - 9.2.80
441.	Factors that make agri. graduates	Er Uzhavan - 9.2 80
442.	Poultry Rearing	Valarum Velanmai - Dec. 79
443.	Fast growing silver carps	Valarum Velanmai - Dec 79
444.	Lemon	Valurum Velanmai - Dec. 79
445.	Birth Control& Country's economy	Valarum Velanmai - Dec. 79
446.	Medicinal plant - Pyrethram	Valarum Velanmai - Dec. 79
447.	Seed Testing	Valarum Velanmai - Dec, 79
448.	Physical Properties of soil and Plant growth	Valarum Velanmai - Dec. 79
449.	Turmeric : Question - Answer	Valarum Velanmai - Dec. 79
450.	Our offerings	Valarum Velanmai - Jan. 80
451.	Maintenance of Cows	Valarum Velanmai - Jan. 80

452.	New Findings in Banana	Valarum Velanmai - Jan. 80
453.	Let us rear fish for prosperity	Valarum Velanmai - Jan. 80
454.	New Disciplines of Vet. College	Valarum Velanmai - Jan. 80
455.	Luceana A New Fodder tree	Valarum Velanmai - Jan. 80
456.	You too can become Convenor	Valarum Velanmai - Jan. 80
457.	Sorghum : Question - Answer	Valarum Velanmai - Jan. 80
458.	Thresher of Multiple crops	Valarum Velanmai - Feb. 80
459.	Poor Man's Cow	Valarum Velanmai - Feb 80
460.	Maize in Tamil Nadu	Valarum Velanmai - Feb. 80
461	Diseases of Cumbu and Ragi	Valarum Velanmai - Feb. 80
462.	Magnesium for acid soils	Valarum Velanmai - Feb. 80
463.	Rice Mills in Tamil Nadu	Valarum Velanmai - Feb. 80
464.	How to control striga ?	Valarum Velanmai - Feb. 80
465.	Farm Budgeting	Valarum Velanmai - Feb. 80
466.	Easy Extraction Method for chilli seeds	Valarum Velanmai - Feb. 80
467.	Individual contact in Extension	Valarum Velanmai - Feb. 80
468.	Inter crop in Turmeric	Valarum Velanmai - Feb. 80
469.	Local dialects of farmers	Valarum Velanmai - Feb. 80
470.	Cholam : Question - answer	Valarum Velanmai - Feb. 80
471.	Visit Our University	Valarum Velanmai - March 80
472.	Views of Sericulturists	Valarum Velanmai - March 80
473.	Reddening of Cotton leaves	Valarum Velanmai - March 80
474.	More Profit through application	Valarum Velanmai - March 80
475.	To Store Lemon longer	Valarum Velanmai March 80
476.	More Fish production through induced breeding	Valarum Velanmai - March 80
477.	Farm School on AIR	Valarum Velanmai - March 80

478.	Single pesticide cures two diseases	Valarum Velanmai - March 80
479.	Digestable protein of certain Millets	Valarum Velanmai - March 80
480.	High yielding Castor Mutant	TNAU News Letter - April 79
481.	New Varieties of wheat for Tamil Nadu	TNAU News Letter - April 79
482.	DAP Foliar Spray in Blackgram	TNAU News Letter - April 79
483.	Cowpea Co 26 as a Superior Fodder	TNAU News Letter - April 79
484.	Rice Bran Oil	TNAU News Letter - April 79
485.	Control of Chilli white aphid	TNAU News Letter - April 79
486.	Effective control of Mango Borer	TNAU News Letter - April 79
487.	Trunk injection for Coconut	TNAU News Letter - April 79
488.	Trunk injection on Yield of Coconut	TNAU News Letter - April 79
489.	New Pest on Patchouli	TNAU News Letter - April 79
490.	Epidemiology of Banana Bunchy top	TNAU News Letter - April 79
491.	Effective Chemical ripener for Sugarcane	TNAU News Letter - April 79
492.	Economics of Hybrid Seed Production	TNAU News Letter - April 79
493.	Food Preference of Freshwater Prawn	TNAU News Letter - April 79
494.	Effect of day temperature and decks on caged white leghorn	TNAU News Letter - April 79
495.	Body weight and wool yield of Nilagiri Sheep	TNAU News Letter - April 79
496.	Micromutation studies in Blackgram	TNAU News Letter - April 79

497.	For High Yield in Eucalyptus	TNAU News Letter - April 79
498.	Mycotoxin Analysis	TNAU News Letter - April 79
499.	Pendant and Erect nature of fruiting in Chilli.	TNAU News Letter - May 79
500.	Genetic variability in Cowpea	TNAU News Letter - May 79
501.	Promising Groundnut Bunch Selection OSN - 2.	TNAU News Letter - May 79
502.	Vegetative Propagation of Eucalyptus	TNAU News Letter - May 79
503.	Growing Water melon and Cucumber in Summer in black soil.	TNAU News Letter - May 79
504.	Control of Powdery Mildew in Rose.	TNAU News Letter - May 79
505.	Insecticide Residues in Hill Banana	TNAU News Letter - May 79
506.	Effects of insect moulting inhibitor on Parasites.	TNAU News Letter - May 79
507.	Weed control in Tomato	TNAU News Letter - May 79
508.	Boron and Molybdenum for Pulses	TNAU News Letter - May 79
509.	Effective Extension Methods for Tribals.	TNAU News Letter - May 79
510.	Hormonal Spray to Boost Yield of Hill Banana	TNAU News Letter - May 79
511.	Treatment for improving germination of Nellikkal.	TNAU News Letter - May 79
512.	Groundnut pod storage	TNAU News Letter - May 79
513.	Marketing of Pesticides	TNAU News Letter - May 79
514.	Intercropping of Gingelly	TNAU News Letter - May 79
515.	Water Hyacinth as Animal Feed	TNAU News Letter - May 79
516.	Brooding and growth rate of chicks.	TNAU News Letter - May 79
517.	Kovai Seed Planter	TNAU News Letter - June 79

518.	Intercropping of Chilli with Onion	TNAU News Letter - June 79
519.	Investigations on 'NO TILLAGE'	TNAU News Letter - June 79
520.	Root Studies on Sorghum & Bajra	TNAU News Letter - June 79
521.	Fertilizer schedule for dry sorghum	TNAU News Letter - June 79
522.	Seed invigouration in Papaya	TNAU News Letter - June 79
523.	Effects of Juvenile Hormone Minimics (JHM) on Prodenia	TNAU News Letter - June 79
524.	Germination improvement in Pala seeds.	TNAU News Letter - June 79
525.	Quality seed production in green gram	TNAU News Letter - June 79
526.	Fodder value of Tree leaves	TNAU News Letter - June 79
527.	Mixed cropping of Maize with Legume	TNAU News Letter - June 79
528.	Control of Bacterial leaf blight of paddy	TNAU News Letter - June 79
529.	New rust resistant variety	TNAU News Letter - June 79
530.	Trunk injection for Coconut	TNAU News Letter - June 79
531.	Residual effects of trunk injection	TNAU News Letter - June 79
532.	Biological Control of Nephantis	TNAU News Letter - June 79
533.	Coconut Storage and Pesticide Residue.	TNAU News Letter - June 79
534.	Pattern of Employment and income Distribution	TNAU News Letter - Juue 79
535.	Cropping intensity in Farms of Different Farm size and Tenure	TNAU News Letter - June 79
536.	Methods of extraction of Essential oils from Rose.	TNAU News Letter - June 79
537.	Tenderization of Poultry Meat	TNAU News Letter - June 79
538.	Skin Damage by Ticks	TNAU News Letter - June 79
539.	Frozen Semen Production	TNAU News Letter - June 79

540.	New Research Project on Soil Conservation	TNAU News Letter - July 79
541.	Short duration varieties of Sugar-cane	TNAU News Letter - July 79
542.	A new type of Amaranthus for clipping.	TNAU News Letter - July 79
543.	Planting Material for Pyrethrum	TNAU News Letter - July 79
544.	Interspecies Grafts in Jasminum	TNAU News Letter - July 79
545.	Top working in Nutmug	TNAU News Letter - July 79
546.	Effect on split application of N on yield of Co 1 Tomato.	TNAU News Letter - July 79
547.	Control of cardamom Stemborer	TNAU News Letter - July 76
548.	Control of Pepper leaf gall thrips	TNAU News Letter - July 79
549.	Implanting of Weedicide in Banana	TNAU News Letter - July 79
550	Life cycle studies of Ticks	TNAU News Letter - July 79
551.	Carrying capacity of sheep in Kikyu + Clover pastures	TNAU News Letter - July 79
552.	Acute Parturient Parasis in a Cross-bred cow	TNAU News Letter - July 79
553.	To increase body weight of Broilers	TNAU News Letter - Juln 79
554.	Highlethal tolerance of milk fish	TNAU New Letters - July 79
555.	CARDS-Centre for Agricultural and Rural Development Studies	TNAU News Letter - August 79
556.	Foliar Diagnosis Laboratory	TNAU News Letter - August 79
557.	Sindhi, Jersey cross for High Milk Yield	TNAU News Letter - August 79
558.	Low Density Mash for Fowls	TNAU News Letter - August 79
559.	Inter Specific Hybridization of Capsicum	TNAU News Letter - August 79
560.	Carrot varieties for the Plains	TNAU News Letter - August 79
561.	Growth and Development of Mint under Kodaikanal conditions.	TNAU News Letter - August 79

562.	Seed Production in Cabbage under Kodaikanal conditions	TNAU News Letter - August 79
563.	Optimum Stage of Harvesting in Geranium	TNAU News Letter - August 79
564.	Study on Ecology of Prodenia	TNAU News Letter - August 79
565.	Efficacy of Neem Products on Rice Brown planthopper	TNAU News Letter - August 79
566.	Physiological control of Nephantis	TNAU News Letter - August 79
567.	Effect of Irrigation Regimes and Nitrogen Levels on Ragi Co 11.	TNAU News Letter - August 79
568.	Steps for increasing Rice Production in Kaveripakkam	TNAU News Letter - August 79
569.	Body Weight and Wool Yield of Merinos	TNAU News Letter - August 79
570.	Exotic Fish Breeding using Kutty's Fish Hatchery	TNAU News Letter - August 79
571.	Intercropping in Groundnut	TNAU News Letter - August 79
572.	Futurology Workshop on Pesticides	TNAU News Letter - Sept. 79
573.	Workshop on Microbial inoculants	TNAU News Letter - Sept. 79
574.	Intercropping in Turmeric	TNAU News Letter - Sept. 79
575.	Cage culture of carps	TNAU News Letter - Sept. 79
576.	Recycling of pig dung for fish culture	TNAU News Letter - Sept. 79
577.	Black spot Disease of Mullet	TNAU News Letter - Sept. 79
578.	Induced carp spawning Technique	TNAU News Letter - Sept. 79
579.	Trunk injection for Coconut	TNAU News Letter - Sept. 79
580.	Pattern of Pink Bollworm moth catches in Pheromone Traps	TNAU News Letter - Sept. 79
581.	Garlic Extract for insect control	TNAU News Letter - Sept. 79

582.	Effect of moulting Inhibitor on Brinjal beetles	TNAU News Letter - Sept. 79
583.	Research on Cashew	TNAU News Letter - Sept. 79
584.	Effect of Irrigation Regimes and Phosphorus levels on Sunflower	TNAU News Letter - Sept. 79
585.	Moisture Conservation in Acid Lime	TNAU News Letter - Sept. 79
586.	Control of Parthenium	TNAU News Letter - Sept. 79
587.	Seed Production in Chicory	TNAU News Letter - Sept. 79
588.	Nutrient deficiency in Tuberose	TNAU News Letter - Sept. 79
589.	Prevention of Bud and Boll Shedding cotton.	TNAU News Letter - Sept. 79
590.	Reddening of Leaves in Cotton	TNAU News Letter - Sept. 79
591.	Rearing of Broiler Chicks	TNAU News Letter - September 7
592.	Seasonal Incidence of Rice Leaf Folder.	TNAU News Letter - September 7
593.	New Departments of Animal Science	TNAU News Letter - Oct. 79
594.	Bush Type French Beans for Plains	TNAU News Letter - Oct 79
595.	Seed Production in Cauliflower	TNAU News Letter - Oct. 79
596.	Evaluation of Bellary Onion Varieties	TNAU News Letter - Oct. 79
597.	Economics of Rearing White Leg-horn Male Chicks	TNAU News Letter - Oct. 79
598.	Hastening Seed Germination in Cardamom	TNAU News Letter - Oct. 79
599.	Fertilizer Experiment on Co 3 Onion	TNAU News Letter - Oct. 79
600.	Seed treatment for Bengalgram root rot control.	TNAU News Letter - Oct. 79
601.	Storage of Brinjal Seeds	TNAU News Letter - Oct. 79

602.	Control of Seed-borne Pathogens in Bhendi	TNAU News Letter - Oct. 79
603.	Control of pests and diseases of cotton	TNAU News Letter - Oct. 79
604	Control of Cotton Boll Worms	TNAU News Letter - Oct. 79
605.	Effect of NAA and N on MCU9	TNAU News Letter - Oct. 79
606.	Insect growth regulators on Redhairy caterpillar.	TNAU News Letter - Oct. 7e
607.	Response of Cowpea to Phosphorus & growth regulatar application	TNAU News Letter - Oct. 79
608.	Planofix on Chillies	TNAU News Letter - Oct. 79
•609.	Quick viability Test for Cardamom	TNAU News Letter - Oct. 79
610.	Germination Studies of Oilpalm Seed nuts	TNAU News Letter - Oct. 79
611.	Leucaena - A Wonder Fodder cum Fuel Tree for semiarid Tropics	TNAU News Letter - Nov. 79
612.	An Improved method for seed extraction in chillies	TNAU News Letter - Nov. 79
613.	Cultivation of Chicory	TNAU News Letter - Nov. 79
614.	Removal of hard pans increases yield of sorghum	TNAU News Letter - Nov. 79
615.	Foliar spray of Ferrous Sulphate for Sorghum varieties.	TNAU News Letter - Nov. 79
616.	Phosphorus and Molybdenum Nutrition with Rhizobial seed inoculation in Redgram	TNAU News Letter - Nov. 79
617.	Studies on the Effect of Plant Density and Chemical Defoliants on MCU 9 Cotton	TNAU News Letter - Nov. 79
618.	Insect Hormone on Production of Parasites	TNAU News Letter - Nov, 79
619.	Control of Rust and Tikka Diseases of Groundnut	TNAU News Letter - Nov. 79

620.	Control of Rust and Tikka Diseases of Groundnut	TNAU News Letter - Nov. 79
621.	Low Cost Biogas Plant (TNAU Model - II)	TNAU News Letter - Nov. 79
622.	Effect of Additives on Chicks	TNAU News Letter - Nov. 79
623.	Spent Tea Dust and Peltaphorum flower meal as yolk pigmentors	TNAU News Letter - Nov. 79
624.	Effect af age on Greasy Fleace Yield in Grozney Merino Breed	TNAU News Letter - Nov. 79
625.	Unprecedented heavy rainfall in November 1979	TNAU News Letter - Nov. 79
626.	Monoculture of Tilapia	TNAU News Letter - Nov. 79
627.	Effect of irradiation in Fenugreak	TNAU News letter - Dec. 79
628.	Nutrient Uptake by Geranium	TNAU News letter - Dec 79
629.	Promising Temperate Vegetables for Rainfed Culture in Shevroys	TNAU News letter - Dec. 79
630.	Control of Ragi Rusty Plum Aphid	TNAU News letter - Dec. 79
631.	Control of Banana Aphid	TNAU News Letter - Dec. 79
632.	The Predator Fauna of Rice Eco-system	TNAU News Letter Dec. 79
633.	Chemical Weed Control in Groundnut	TNAU News Letter - Dec 79
634.	Single fungicides controls rust and tikka of groundnut	TNAU News Letter - Dec. 79
635.	Seed borne pathogens on Cros-sandra Seed	TNAU News Letter - Dec. 79
636.	Studies on the effect of Nitrification inhibitors on Cotton MCU 5	TNAU News Letter - Dec. 79
637.	Rural Structure and inter industry Analysis	TNAU News Letter - Dec. 79
638.	Tungro Virus Tolerant Rice in the Offing	TNAU News Letter - Dec. 79
639.	Tolerance of Tree Spices and Cacao to Water logging	TNAU News Letter - Dec. 79

640.	Thermal Tolerance of Fishes of of Tuticorin Bay	TNAU News Letter - Dec. 79
641.	Restricting feeding time in Broilers	TNAU News Letter - Dec. 79
642.	Causes of hige prices of Onion and Tomato	TNAU News Letter - Dec. 79
643.	Economics of Chillies production	TNAU News Letter - Dec. 79
644.	MCU 7 Cotton Pays dividends in Thanjavur	TNAU News Letter - Dec. 79
645.	Hybrid Coconut for increased Production	TNAU News Letter - Feb. 80
646.	A New Rice Variety - PY 2	TNAU News Letter - Feb. 80
647.	How to raise vigorous Eucalptus seedlings	TNAU News Letter - Feb. 80
648.	Seed Treatment against sucking pests of cotton	TNAU News Letter - Eeb. 80
649.	Resurgence of Brown Plant Hopper	TNAU News Letter - Feb. 80
650.	Sex Ratio & Egg Production in Rice Gall fly	TNAU News Letter - Feb. 80
651.	A New Fungicide to Control green ear of Bajra	TNAU News Letter - Feb. 80
652.	Shevaroy Hills suited for Pineapple	TNAU News Letter - Feb. 80
653.	Total Glycoside content in Fox Glove	TNAU News Letter - Feb. 80
654.	Influence of Season, Spacing and Nitrogen on seed yield of Jute Varieties	TNAU News Letter - Feb. 80
655.	Crop - Weed Competition in Groundnut	TNAU News Letter - Feb. 80
656.	Cheap Semen Freezer	TNAU News Letter - Feb. 80
657.	Low Oxygen Tolerance of Fishes	TNAU News Letter - Feb, 80

658.	Composite Fish Culture in Tuticorin	TNAU News Letter - Feb. 80
659.	Feeding of Grass Carp	TNAU News Letter - Feb. 80
660.	Consensus between Researcher-and Extension Workers	TNAU News Letter Feb. 80
661.	'Dimlin' - a New insecticide for Castor Semilooper	TNAU News Letter - Fed. 80
662.	Namatode - Wilt Complex control in Bhendi	TNAU News Letter - March 80
663.	Breaking Dormancy in IR 20 Rice and Co 5 Thenai	TNAU News Letter - March 80
664.	Rice - based Multiple Cropping systems and their Fertility Management	TNAU News Letter March 80
665.	Targetting Yield for Sorghum	TNAU News Letter - March 80
666.	Fertilizer requirement for quality Amaranthus at optimum stage of harvest	TNAU News Letter - March 80
667.	Effect of mulches in reduction of irrigation requirement of cotton	TNAU News Letter - March 80
668.	Ideal Nursery medium for Bamboo	TNAU News Letter - March 80
669.	Weather change during Solar Eclipse	TNAU News Letter - March 80
670.	Effect of Solar Eclipse on Fish	TNAU News Letter - March 80
671.	Levels of Living of Fishermen	TNAU News Letter - March 80
672.	Effect of N&K on MDU 1 Chilli	TNAU News Letter - March 80
673.	Economics of Tapioca Production and Processing	TNAU News Letter - March 80
674.	Supply - Price Relationship of Rice in Tamil Nadu	TNAU News Letter - March 80
675.	Cowpea a substitute for Horsegram	TNAU News Letter - March 80
676.	Farm Capital Structure and Productivity	TNAU News Letter - March 80
677.	Village School Teachers for Extension	TNAU News Letter - March 80

APPENDIX VI

NUMBER OF ENQUIRIES ANSWERED, QUANTITY OF IMPROVED SEEDS, PLANTS AND OTHER MATERIALS SUPPLIED, BY THE VARIOUS DEPARTMENTS OF TAMIL NADU AGRICULTURAL UNIVERSITY

ITEMS	Number of enquiries answered	Quantity of seeds/materials of improved strains supplied for			Plants and miscellaneous materials supplied/sold
		Experimental purpose (Kg)	Multiplication purpose (Kg)	General cultivation (Kg)	
(1)	(2)	(3)	(4)	(5)	(6)
Rice	1986	3,104	25,245	2,16,000	—
Millets	859	138	488	1,232	—
Minor Millets	206	17	769	191	—
Oilseeds	452	116	597	3,685	46,315
Pulses	461	1,368	8,004	2,605	—
Forage seeds/slips	422	8	—	—	2,06,400
Coconuts	40	—	—	—	1,98,025
Food Technology	256	—	—	—	—
Fruits & Plants	444	15	25	200	1,15,600
Chillies & Spice Plants	396	3	10	4	21,560
Ornamental Plants	48	25	1.5	1.3	45,810
Vegetable seeds & Seedlings	986	92	315	1,277	9,209
Flower Seeds & Seedlings	70	—	—	—	1,397
Coffee seeds	—	—	—	—	1,027
Medicinal & Aromatic plants	429	—	—	—	96,230
Seed Technology	56	—	—	—	3,290
Forestry seedlings	—	—	—	—	1,98,525

(1)	(2)	(3)	(4)	(5)	(6)
Mushroom bottles & Inoculam culture pockets	2,255	—	—	—	—
Plant protection pests	675	—	—	—	—
Plant protection diseases	1,162	—	—	—	—
Agricultural Chemistry	11	—	—	—	—
Soils	93	—	—	—	—
Fertilizer	89	—	—	—	—
Irrigation water	9	—	—	—	—
Agricultural Economics	69	—	—	—	—
Agricultural Engineering	294	—	—	—	—
Animal Husbandry	357	—	—	—	—
Milk	—	—	—	—	88,686 Lit.
Egg poultry brids etc.	—	—	—	—	1,22,685
Artificial insemination done	—	—	—	—	7,585
Frozen semen supplied	—	—	—	—	17,585
No. of laboratory animals supplied	—	—	—	—	4,154
Feed samples analysed	—	—	—	—	53
Post-mortems conducted	—	—	—	—	670
Histopathological examination made	—	—	—	—	8,622
Specimens examined	—	—	—	—	7,972
Cultural examinations	—	—	—	—	1,314
Health certificates issued	—	—	—	—	180

APPENDIX VII

List of All India Radio broadcast for 1979-80

1.	1.4.79	Vivasaya Arangam-Banana Cultivation - summary and questions	Dr V N. Madhava Rao Professor&Head Pomology
2.	2.4.79	Conversation - Seed production in Varalakshmi	K. Lakshmanan District Agrl. Officer, Farmers Training Centre, Coimbatore.
3.	3.4.79	Disease of Betelvine	Dr. N. Shanmugam Associate Proffesor Plant Pathology
4.	4.4.79	Farm School on AIR - Soil types and plant growth-Soil fertility and plant growth	Dr. K. M. Ramanathan Associate Professor Soil Science and Agrl. Chemistry.
5.	4.4.79	Dairy Farming-contact programme	Director of Extension Education.
6.	7.4.79	Vivasaya Seithi Malar - control of fungal diseases of rice	P. Durairaj Assistant Professor Plant Pathology.
7.	8,4.79	Disease control in gingelly	Dr. N. Shanmugam Associate Professor Plant Pathology.
8.	7.4.79	Diseases of tapioca	K. Sivaprakasam Assistant Professor Plant Pathology.
9.	8.1.79	Vivasaya Arangam - Soil fertility	Dr. K. M. Ramanathan Associate Professor Soil Science and Agrl. Chemistry.

10.	10.4.79	Maintenance of cross - breds	Dr. C. A. Gopalakrishnan Professor & Heed Animal Hushandry.
11.	11.4.79	Farm School on AIR - Soil types and plant growth - Soil testing and fertilizer application	P. P. Ramasamy Assistant Professor Soil Science and Agrl. Chemistry.
12.	14.4.79	Vivasaya Seithi Malar-Diseases of cumbu and ragi	M. Muthusamy Assistant Professor Plant Pathalogy.
13.	14-4-79	Diseases of Sunflower	V. Narasimhan Asst. Professor Plant Pathology
14.	14 4 79	Diseases of Sorghum	Tmt. Kousalya Gangatharan Assoc. Professor Plant Pathology
15.	18-4-79	Farm School on AIR-Micronutrients and Plant growth	Dr. G. Ramanathan Assoc. Professor Soil Science & Agrl. Chem.
16.	21.4.79	Vivasaya Seithi Malar Leaf spot disease of banana	Mohamed Ushman Asst. Professor Plant Pathology
17.	21.4.79	Bud rot disease of Coconut	G. Arjunan Asst. Professor Plant Pathology.
18.	21.4.79	Chilli seed extraction and storage	C. P. Thiyagrajan Asst. Professer Seed Technology
19.	24.4.79	Vivasaya Arangam-Micronutrients and Plant growth	Dr. G. Ramanathan Assoc. Professor Soil Science & Agrl Chem.
20.	25.4.79	Farm School on AIR - Reclamation of alkali soils	V. S. Krishnamoorthy Asst. Professor Soil Science & Agrl. Chem.

21.	28.4.79	Vivasaya Seithi Malar-seed production and storage of redgram	Dr. T. V. Karivaradaraj Assoc. Professor Seed Technology
22.	28.4.79	Seed production and storage of bengalgram	V. Ramakrishnan Assoc. Professor Seed Technology
23.	28.4.79	Separating immature seeds of brinjal	Tmt. Jaculin Selvaraj Asst. Professor Seed Technology
24.	29.4.79	Vivasaya Arangam - Reclamation of Alkali soils	V. S. Krishnamoorthy Asst. Professor Soil Science & Agrl. Chem.
25.	1.5.79	Turmeric Cultivation	R Sundararajan Dy. Director of Extension Edu., Communication Centre
26.	2 5.79	Farm School on AIR-Reclamation of acid and saline soils	K. K. Madan Asst. Professor Soil Science & Agrl. Chem.
27.	5.5.79	Vivasaya Seithi Malar New rice Puduvai Ponni	—
28.	6.5.79	Vivasaya Arangam - Reclamation of acid and saline soils	K K. Madan Asst. Professor Soil Science & Agrl. Chem.
29.	9.5.79	Farm School on AIR-Soil Types and Plant Growth - Quality of irrigation water and plant growth	A. Rajamannar Asst. Professor Soil Science & Agrl. Chem.
30.	12.5.79	New method of controlling black-headed caterpillar of coconut	Dr. T. R. Subramaniam Professor & Head Entomology
31.	12.5.79	Animal Scerer	M. Balasubramanian Asst. Professor Agrl. Processing
32.	13.5.79	Vivasaya Arangam - quality of irrigation water and plant growth	A. Rajamannar Asst. Professor Soil Science & Agrl. Chem.

33.	13.5.79	Turmeric diseases	Dr. T. K. Kandasamy Professor & Head Plant Pathology
34.	16.5.79	Farm School on AIR-Deficiencies of Soils and methods of rectifying	Dr. V. Ravikumar Asst. Professor Soil Science & Agrl. Cher
35.	19.5.79	Vivasaya Seithi Malar-Uses of Neem in Agriculture	Dr. Abdul Kareem Assoc. Professor Entomology
36.	19.5.79	Vivasaya Seithi Malar New method of casuarina cultivation	KU. Ela. Chella Pillai Asst. Professor Forestry
37.	20,5.79	Vivasaya Arangam-Deficiencies of soils and methods of rectifying	Dr. V. Ravikumar Assoc. Professor Soil Science & Agrl. Che
38.	20.5.79	Turmeric cultivation Seminar	Dr. T. K. Kandasamy Professor & Head Plant Pathology.
39.	23.5.79	Farm School on AIR - Soil Types and Plant Growth - Summary and questions	Dr. G.V. Kothandaraman Assoc. Prof. & Head Soil Science & Agrl. Che
40.	26.5.79	Vivasaya Seithi Malar - Groundnut grader	K. Rangaswamy Assistant Professor Agricultural Processing.
41.	26.5.79	Intercrop in casuarina	KU. Ela. Chella Pillai Asst. Prof., Forestry
42.	27.5.79	Vivasaya Arangam - Soil Types and Plant Growth - Summary and Questions	Dr. G.V. Kothandaraman Assoc. Prof. & Head Soil. Science & Agrl. Che
43.	30.5.79	Farm School on AIR - Forage Crops-Fodder grasses cultivation	Dr. P. Chandrasekaran Professor & Head Forage Crops
44.	31.5.79	Do you know? injection for coconuts	—
45.	31.5 79	Mixture of urea and neem	—

46.	2.6.79	Vivasaya Seithi Malar - Apt stage of harvesting rice	K. V. Selvaraj Asst. Professor Agricultural Processing.
47.	2.6.79	Maize drier	T. Tamilmani Research Associate Agricultural Processing.
48.	3.6.79	Vivasaya Arangam - Fodder grasses cultivation	Dr. P. Chandrasekaran Professor & Head Forage Crops & Head
49.	6.6.79	Farm School on AIR - Leguminous fodders	N. R. Chandrasekaran Assoc Prof., Forage.
50.	9.6.79	Vivasaya Seithi Malar - Apt. Stage of harvesting groundnut	K. V. Selvaraj Assistant Professor Agricultural Processing.
51.	9.6.79	Oil extraction of Sunflower	C. R. Shanmugam Professor & Head Agricultural Processing.
52.	10.6.79	Vivasaya Arangam - Leguminous fodders	N. R. Chandrasekaran Assoc. Prof., Forage.
53.	13.6.79	Farm School on AIR - Cereal legume mixed fodders	P. Vaidyanathan Asst. Prof., Forage
54.	17.6.79	Vivasaya Arangam - Cereal legume mixed fodders	P. Vaidyanathan Asst. Prof., Forage.
55.	20.6.79	Farm School on AIR - Fodder trees	Dr. M. Balasubramanian Assoc. Prof., Forage.
56.	23.6.79	Vivasaya Seithi Malar - Multiple cropping	Dr. SP. Palaniappan Assoc. Professor
57.	26.6.79	Herbicides	S. N. Kulandaisamy Assoc. Prof., Agronomy.
58.	24.6.79	Vivasaya Arangam - Fodder trees	Dr. M. Balasubramanian Assoc. Prof., Forage.
59.	27.6.79	Farm School AIR - Forage Crops summary and questions	Dr. P. Chandrasekaran Dean
60.	28.6.79	Agri. Quiz	Dr. A. John Knight Professor & Head Dept. of Agrl. Extension

61.	30.6.79	Vivasaya Seithi Malar - Gingelly cultivation	G. Venkatesan Assoc. Prof , Agronomy.
62	30.6.79	Super seedlings	S. Sadaiyappan Asst. Prof., Agronomy
63.	1.7.79	Vivasaya Arangam - Forage Crops Summary and Questions	Dr. P. Chandrasekaran Dean.
64.	4.7.79	Farm School on AIR - Seasons and High yielding rice varieties	Dr. J. Chandramohan Assoc. Prof., Agrl. Botany
65.	5.7.79	Integrated Plant protection measures	Dr. M. Balasubramanian Prof. & Head, Entomology
66.	7.7.79	Vivasaya Seithi Malar - Intercrop for rainfed Cotton	Pothiraj Asst. Prof., Agronomy.
67	7.7.79	Co 3 Onion	K. P. Palanisamy *Asst. Prof., Horticulture*
68.	8.7.79	Vivasaya Arangam - Seasons and high yielding rice varieties	Dr. J. Chandramohan Associate Professor Agricultural Botany
69.	8.7.79	Marketing farm produce	Dr. P. K. Aiyasamy Professor & Head Agrl. Economics
70.	11.7.79	Farm School on AIR - Rice nursery techniques	S. Sadaiyappan Asst. Prof., Agronomy.
71.	14.7.79	Vivasaya Seithi Malar - Intercrops	Subbiah Asst. Prof., Agronomy.
72.	14.7.79	Single budded sets for tapioca	S. Thamburaj Assoc. Prof., Horticulture.
73.	15.7.79	Vivasaya Arangam - Rice nursery techniques	S. Sadaiyappan Asst. Prof., Agronomy.
74.	18.7.79	Farm School on AIR - Manuring rice	C. T. Natarajan Assoc. Prof., Agronomy.
75.	18.7.79	Cotton Growers' Forum - which variety to select ?	S. Kamalanathan Prof., Agrl. Botany.
76.	21.7.79	Raising tree seedlings	M. Gulam Dus Thakir Asst. Prof., Forestry.

77.	21.7.79	Implements suited to rice farming	K. Karunanithi Assistant Professor Agrl. Processing
78.	22.7.79	Vivasaya Arangam - Manuring rice	C. T. Natarajan Assoc. Prof., Agronomy.
79.	25.7.79	Farm School on AIR - Weedicides and after cultivation	R. Kulandaivelu Assoc. Prof., Agronomy.
80.	28.7.79	Vivasaya Seithi Malar - Tree planting in farms	N. Sankaran Asst. Prof., Forestry.
81.	29.7.79	Diseases of turmeric	Dr. T. K. Kandasamy Professor & Head Plant Pathology
82.	29.7.79	Vivasaya Arangam - Weedicides and after cultivation	R. Kulandaivelu Associ. Prof., Agronomy.
83.	31.7.79	Eucalytus in plains	Dr. M. Rathinam Associ. Prof., Forestry.
84.	1.8.79	Farm School on AIR - Rice pests and control measures	A. Mohamed Haneefa Asst. Prof., Entomology.
85.	4.8.79	Vivasaya Seithi Malar - Fertilizers and nature of water absorption	K. Subbiah Assistant Professor, Soil Science & Agrl. Chemistry.
86.	5.8.79	Vivasaya Arangam - Rice pests and control measures	A. Mohamed Haneefa Asst. Prof., Entomology.
87.	8.8.79	Farm School on AIR - Rice diseases and control measures	Dr. V. Mariappan Associate Professor Plant Pathology
88.	8.8.79	Cotton Growers' Forum-Cotton pest control	Dr. A. Abdul Kareem Assoc. Prof., Entomology
89.	11.8.79	Vivasaya Seithi Malar - Co 1 Safflower	M. Subramanian Asst. Prof., Agrl. Botany
90.	11.8.79	Water requirements of rainfed crops	K. Subbiah Assistant Professor, Soil Science & Agrl. Chemistry
91.	12.8.79	Vivasaya Arangam - Rice diseases and control measures	Dr. V. Mariappan Associate Professor Plant Pathology.

92.	12.8.79	Independence Day News for farmers	A. Venkataraman, IAS Vice-Chancellor.
93.	15.8.79	Farm School on AIR - Low cost rice technology	Dr. V. Sivasubramanian Assoc. Prof., Agrl. Botany
94.	18.8.79	Vivasaya Seithi Malar - Role of chemicals that correct soils and enhance production	Dr. V. Ravikumar Assoc. Professor, Soil Science & Agrl. Chemistry.
95.	1[illegible].8.79	Phosphatic fertilizer for rainfed pulses	K. Subbiah Assistant Professor, Soil Science & Agrl. Chemistry.
96.	19.8.79	Vivasaya Arangam - Low-cost rice technology	Dr. V. Sivasubramanian Assoc. Prof., Agrl. Botany.
97.	22.8.79	Farm School on AIR - New Method of Rice Cultivation - Summary and Questions	Prof. A. Subramanian Agricultural Botany.
98.	23.8.79	Fulgorid control	Dr. A. Abdul Kareem Assoc. Prof., Entomology.
99.	23.8.79.	Vivasaya Seithi Malar - Co 1 Groundnut	M. Subramanian Assistant Professor Agricultural Botany
100.	25.1.79	Mulches for rainfed black cotton soils	K. Subbiah Assistant Professor Soil Science & Agricultural Chemistry.
101.	26.8.79	Vivasaya Arangam-New method of Rice Cultivation-summary and questions	A. Subramaniam Professor Agricultural Botany.
102.	29.8.79	Farm School on AIR - Chilli Cultivation varieties	P. Rengasamy Assistant Professor Horticulture.
103.	31.8.79	Pruning Mangoes	Dr. V. N. Madhava Rao Professor and Head Pomology
104.	1.9.79	Vivasaya Seithi Malar - Magnesium for acid soils	K. K. Madan Assistant Professor Soil Science & Agricultural Chemistry

105.	1.9.79	Importance of testing irrigation water	A. Gopalasamy Associate Professor Soil Science & Agricultural Chemistry
106.	2.9.79	Vivasaya Arangam - Chilli varieties	P. Rengasamy Assistant Professor Horticulture
107.	2.9.79	Marketing farm produce	A. Venkataraman Vice-Chancellor
108.	5.9.79	Farm School on AIR - Chilli cultivation	P. Rengasamy Assistant Professor Horticulture.
109.	6.9.79	Kovai Seed Planter	K. Karunanidhi Assistant Professor Agricultural Engineering.
110.	8.9.79	Vivasaya Seithi Malar - Nutritive values of fodders	C.R. Lakshmi Narasimhan Assistant Professor Soil Science & Agricultural Chemistry.
111.	8.9.79	Hardness of soil and plant growth	K. Shanmugam Assistant Professor Soil Science & Agricultural Chemistry.
112.	9.9.79	Vivasaya Arangam - Chilli cultivation	P. Rengasamy Assistant Professor Horticulture
113.	11.9.79	Controlling fulgorid pest	Dr. A. Abdul Kareem Associate Professor Entomology.
114.	12.9.79	Farm School on AIR - Pests of chilli and control	A. Azeez Bhasa Assistant Professor Entomology
115.	15.9.79	Vivasaya Seithi Malar - Rice bran oil	Dr. U. S. Sree Ramulu Associate Professor Soil Science & Agricultural Chemistry.

116.	15 9.79	Soil Physical properties	Thiyagarajan Assistant Professor Soil Science & Agricultural Chemistry
117.	16.9.79	Vivasaya Arangam - Chilli pest control	A. Azeez Bhasa Assistant Professor Entomology.
118.	19.9.79	Farm School on AIR - Chilli disease control	A. Venkata Rao Associate Professor Plant Pathology.
119.	20.9.79	For betterment of dryland farmers - Discussion	A. Venkataraman Vice-Chancellor
120.	22.9.79	Vivasaya Seithi Malar - Water conservation techniques in dryland	K. Subbiah Assistant Professor Soil Science & Agricultural Chemistry.
121.	22.9.79	Importance of Potash	Tmt. Hanora J. Francis Assistant Professor Soil Science & Agricultural Chemistry.
122.	22.9.79	Ill effects of industrial waste	P. Singaram Assistant Professor Soil Science & Agricultural Chemistry.
123.	23 9.79	Vivasaya Arangam - Plant protection for chilli	A. Venkata Rao Associate Professor Plant Pathology
124.	26.9.79	Farm School on AIR - Chilli cultivation-Summary and questions	Dr. K. G. Shanmugavelu Professor and Head Olericulture.
125.	28.9.79	Vivasaya Seithi Malar - crops suitable for drylands	K. Subbiah Assistant Professor Soil Science & Agricultural Chemistry.
126.	28.9.79	New method of reclaiming alkali soils	P. Singaram Assistant Professor Soil Science & Agricultural Chemistry.

127.	28.9.79	Fertilizer mixture for sorghum	S. Subbiah Assistant Professor Soil Science & Agricultural Chemistry.
128.	30.9.79	Vivasaya Arangam - Chilli cultivation-summary and questions	Dr. K. G. Shanmugavelu Professor and Head Olericulture.
129.	3.10.79	Farm School on AIR - Vegetable cultivation - Tomato cultivation	Dr. C. R. Muthukrishnan Dean, Horticulture.
130.	6.10.79	Vivasaya Seithi Malar - Phosphorus and crop rotation	Tmt. G. Selvakumari Assistant Professor Soil Science & Agricultural Chemistry.
131.	6.10.79	Can we apply micronutrients more?	Dr. P. Savitri Assistant Professor Soil Science & Agricultural Chemistry.
132.	6.10.79	Agriculture in sewage water	Dr. U. S. Sreeramulu Associate Professor Soil Science & Agricultural Chemistry.
133.	7.10.79	Vivasaya Arangam - Tomato cultivation	Dr. C. R. Muthukrishnan Dean, Horticulture.
134.	8.10.79	Sowing with minimum expenditure - Dialogue	R. Karunanidhi Assistant Professor Agricultural Engineering
135.	10.10.79	Farm School on AIR - Vegetable cultivation-Brinjal cultivation	S. Thamburaj Associate Professor Horticulture.
136.	10.10.79	Cotton Growers Forum - Weevil pests of Cotton	Dr. M. Balasubramaniam Professor and Head Entomology.
137.	13.10.79	Vivasaya Seithi Malar - Irradiation and agriculture	Dr. U. S. Sreeramulu Associate Professor Soil Science & Agricultural Chemistry.

138.	13.10.79	Root studies through irradiation technique	T. L. Subramaniam Assistant Professor Soil Science & Agricultural Chemistry.
139	13.10 79	Permanent Manurial Experiments	Tmt. N. Kanagapushani Assistant Professor Soil Science & Agric ultura Chemistry.
140	14.10.79	Vivasaya Arangam - Brinjal Cultivation	S. Thamburaj Associate Professor Horticulture.
141.	17.10.79	Farm School on AIR - Bhendi cultivation	P. Rengasamy Assistant Professor Horticulture.
142.	17.10.79	Cotton Growers' Forum - Cotton Bollworm control	Dr. M. Balasubramanian Professor and Head Entomology.
143.	20.10.79	Vivasaya Seithi Malar - Importtance of soil analysis	Kumarasamy Assistant Professor Soil Science & Agricultural Chemistry.
144.	20.10.79	Micronutrients for sunflower	R. Devarajan Assistant Professor Soil Science & Agricultura Chemistry.
145.	20.10.79	Cowpea - A good fodder	M. Govindasamy Assistant Professor Soil Science & Agricultural Chemistry.
146.	20.10.79	New Method for dryland sowing-Dialogue	R. Karunanithi Assistant Professor Agricultural Engineering
147.	21.10.79	Vivasaya Arangam - Bhendi cultivation	P. Rengasamy Assistant Professor Horticulture.
148.	24.10.79	Farm School on AIR - Vegetable cultivation-Onion cultivation	K. P. Palanisamy Assistant Professor Horticulture.

149.	27.10.79	Vivasaya Seithi Malar - Tips for drought prone areas	K. Kumarasamy Assistant Professor Soil Science & Agricultural Chemistry
150.	27.10.79	Manuring through soil testing	P. P. Ramasamy Assistant Professor Soil Science & Agricultural Chemistry.
151.	27.10.79	Diseases of groundnut	Dr. P. Narayanasamy Associate Professor Plant Pathology.
152.	28.10.79	Vivasaya Arangam-Onion cultivation	K. P. Palanisamy Assistant Professor Horticulture.
153.	31.10.79	Farm School on AIR - Pandal Vegetables	V. Ashok Mehta Assistant Professor Horticulture.
154.	1.11.79	Nematode control-Dialogue	Dr. C. V. Sivakumar Associate Professor Entomology.
155.	3.11.79	Vivusaya Seithi Malar - Control of Seed borne pathogens	Dr. P. Vidyasekaran Associate Professor Plant Pathology.
156.	3.11.79	Rice sheath blight	Dr. V. Mariappan Associate Professor Plant Pathology
157.	3.11.79	Disease control in Cumbu	N. Muthusamy Asst. Professor Plant Pathology
158.	4.11.79	Vivasaya Arangam-Pandal Vegetable	V. Ashok Mehta Asst. Professor Horticulture
159,	7.11.79	Farm School on AIR-Root Vegetable	Dr. K. G. Shanmugavellu Professor & Head Olericulture

160.	10.11.79	Vivasaya Seithi Malar-Diseases of sunflower	R. Ayyavu Asst. Professor Plant Pathology
161.	10.11.79	Diseases of sorghum	Tmt. Kousalya Gangatharan Assoc. Professor Plant Pathology
162.	11.11.79	Vivasaya Arangam - Root vegetables	Dr. K. G. Shanmugavelu Professor & Head Olericulture
163.	14.11.79	Farm School on AIR - Greens cultivation	M. Kadar Mohideen Asst. Professor Horticulture
164.	17.11.79	Vivasaya Seithi Malar-Diseases of redgram	G. Arjunan Asst. Professor Plant Pathology
165.	17. 11.79	Multi-tier cropping	Dr. S. Muthusamy Professor & Head Plantation Crops & spices
166.	18.11.79	Vivasaya Arangam-Greens Cultivation	Asst. Professor Horticulture
167.	21.11.79	Farm School on AIR-Tapioca & Sweet Potato	N. Ramasamy Asst. Professor Horticulture
168.	24.11.79	Vivasaya Seithi Malar-Turmeric leafspot	G. T. Subbaraja Asst. Professor Plant Pathology
169.	24.11.79	Chickory cultivation	C. M. Pappiae Asst. Professor Horticulture
170.	25.11.79	Vivasaya Arangam-Tapioca and Sweet Potato	N. Ramasamy Asst. Professor Horticulture
171.	28.11.79	Farm School on AIR-Cabbage & cauliflower	O. Anjanam Alagiya Pillai Asst. Professor Horticulture

172.	1.12.79	Vivasaya Seithi Malar - Banana fruit rot	Tmt. Parambaramani Asst. Professor Plant Pathology
173.	Turmeric cultivation		H. Ahamed Shah Asst Professor
174.	2.12.79	Vivasaya Arangam - Cabbage. Cauliflower cultivation	O. Anjanam Alagiya Pillai Asst. Professor Horticulture
175.	2.12.79	Farm School on AIR - contact programme documentary	
176.	5,12.79	Farm School on AIR - Peas, Beans and Potato cultivation	O. Anjanam Alaagiya Pillai Asst. Professor Horticulture
177.	8.12.79	Vivasya Seithi Malar-Diseases of Tuber crops	K. Sivaprakasam Asst. Professor Plant Pathology
178.	8.12.79	Pruning Guava	R. Balakrishnan Assoc. Professor Horticulture
179.	9·12.89	Vivasaya Arangam-Peas, Beans and Potato cultivation	O. Anjanam Alagiya Pillai Asst. Professor Horticulture
180.	10.12.79	Chickory cultivation-Dialogue	R. Balakrishnan Assoc. Professor Horticulture
181.	12.12.79	Farm School on AIR - Perennial vegetables	S. Thamburaj Assoc. Professor Horticulture
182.	13.12.79	Recent rains on crops - Dialogue	Dr. R. Kulandaivelu Assoc Professor Agronomy
183.	15.12.79	Vivasaya Seithi Malar-Diseases of Gingelly	Dr. R. Jeyarajan Assoc. Professor Plant Pathology

184.	15.12.79	Rains and pest occurance	G. Balasubramaniam Asst. Professor Entomology
185.	16.12.79	Vivasaya Arangam - Perennial vegetables	S. Thamburaj Assoc. Professor Horticulture
186.	17.12.79	CARDS	A. Venkataraman, IAS Vice-Chancellor
187.	19.12.79	Farm School on AIR - Kitchen Gardening	Dr. K. G. Shanmugavelu Professor & Head Olericulture
188.	20.12.79	Irrigated groundnut	Dr. R. Kulandaivelu Assoc. Professor Agronomy
189.	22.12.79	Vivasaya Seithi Malar - Monsoonic rains and crop diseases	K. Sivaprakasam Assoc. Professor Agronomy
190.	22.12.79	Spices	R. Balakrishnan Assoc. Professor Horticulture
191.		Vivasaya Arangam-Kitchen Gardening	Dr. K. G. Shanmugavelu Professor & Head Olericulture
192.	26.12.79	Farm School on AIR Vegetables summary and questions	Dr. C. R. Muthukrishnan Dean, Horticulture
193.	26.12.79	Vivasaya Seithi Malar-Eucalyptus planting	C. Surendran Asst. Professor Forestry
194.	29.12.79	Turmeric	H. Ahamed Shah Asst. Professor Horticulture
195.	30.12.79	Vivasaya Arangam - Vegetables Summary and questions	Dr. C. R. Muthukrishnan Dean, Horticulture

196.	2.1.80	Farm School on AIR- Pules cultivation-Blackgram varieties and cultivation	P. Shanmugasundaram Research Associate Agrl. Botany
197.	3.1.80	Specialist time	S. Sambandamoorthy Associate Professor Floriculture
198.	5.1.80	Vivasaya Sethi Malar - Banana bunch top disease	K. Mohamed Usman Asst. Professor Plant Pathology
199.	5.1.80	Chickory cultivation	C. M. Pappiah Asst. Professor Horticulture
200.	6.1.80	Ways to reduce cost of production of milk	Dr. C. A. Gopalakrishnan Professor & Head Animal Husbandry
201.	8.1.80	Farm School on AIR - Pulses-Greengram varieties and cultivation	V. Selvaraj Assoc. Professor Agrl Botney
202.	9.1.80	Farm School on AIR-Pulses Greengram varieties and cultivation	V. Selvaraj Assoc. Professor Agricultural Botany
203.	12.1.80	Vivasaya Sethi Malar - Anai komban on rice	G. Balasubramanian Research Associate Agrl. Botany
204.	12.1.80	Blackgram varieties and cultivation methods	P. Shanmugasundaram Research Associate Agrl. Botany
205.	13.1.80	Vivasava Arangam - Greengram varieties and cultivation	V. Selvaraj Assoc. Professor Agrl. Botany
206.	13-1.80	Our Pongal Releases	A. Venkataraman, IAS Vice - Chancellor
207.	16.1.80	Farm School on AIR- Pulses-Redgram varieties and cultivation	M. Vaman Bhat Assoc. Professor Agrl. Botany.
208.	19.1.80	Vivasaya Seithi Malar - Mixed fodder	Selvi Nagalakshmi Asst. Professor Soil Science & Agrl. Chem.

209.	19.1.80	Rhizome rot of Turmeric	K. Sivaprakasam Asst. Professor Plant Pathology
210.	20.1.80	Vivasaya Arangam - Redgram varieties and cultivation	M. Vaman Bhat Assoc. Professor Agrl. Botany
211.	20.1.80	News reel of new release' function	
212.	23.1.80	Farm School on AIR-Field Beans varieties and cultivation	P. Sivasubramanian Asst. Professor Agrl. Botany
213.	24.1.80	Quiz	Dr. A. John Knight Professor and Head Agrl. Botany
214.	26.1.80	How to paeserve eggs longer?	Selvi G. Manimegalai Asst. Professor Food Technology
215.	26.1.80	Anaikomban of rice	G. Balasubramaniam Asst. Professor Entomology
216.	27.1.80	Vivasaya Arangam-Field Beans varieties and cultivation	P. Sivasubramaniam Asst. Professor Agrl. Botany
217.	30.1.80	Farm School on AIR - Cowpea varieties and cultivation	V. Selvaraj Assoc. Professor Agrl. Botany.
218	2.2.80	Vivasaya Seithi Malar-Soil testing for micronutrients	R. Nagarajan Asst. Professor Soil Science & Agrl. Cher
219.	2.2.80	Organic Manures and physical properties of soils	C. Jayaraman Asst. Professor Soil Science & Agrl. Chei
220.	3.2.80	Vivasasa Arangam-Cowpea varieties and cultivation methods	V. Selvaraj Assoc. Professor Agricultural Botany

221.	5.2.80	Farm School on AIR	Dr. P. V. Marappan, Director of Extn. Education
222.	6.2.80	Farm School on AIR Horsegram & Bengalgram	S. Giridharan, Asst. Professor Agricultural Botany
223.	9.2.80	Vivasaya Seithi Malar-ways of applying iron to crops	R. Nagarajan, Asst. Professor Soil Science & Agrl. Chem.
224.	9.2.80	Nitrogenous fertilizers and quality of rice	R. Krishnasamy, Asst. Professor Soil Science & Agrl. Chem.
225.	10.2.80	Vivasaya Arangam-Horsegram & Bengalgram	S. Giridharan, Asst. Professor Agricultural Botany
226.	13.2.80	Farm School on AIR-Soybean varieties and cultivation	A. Ayyamperumal, Asst. Professor Agricultural Botany
227.	16.2.80	Vivasaya Seithi Malar-Alkali soils and rice cultivation	V. S. Krishnamoorthy, Asst. Professor Soil Science & Agrl. Chem.
228.	16.2.80	Natural manures and physical properties of soil	C. Jayaraman, Asst. Professor Soil Science & Agrl. Chem
229.	17.2.80	Vivasaya Arangam-Soybean varieties and cultivation	A. Ayyamperumal, Asst. Professor Agricultural Botany
230.	20.2.80	Farm School on AIR-Pulses in rice fallows	R. S. Annappan, Professor of Pulses
231.	23.2.80	Vivasaya Seithi Malar-Propagation in turmeric	R. Balakrishnan, Assoc. Professor Horticulture

232.	23.2 80	Co 1 Soybean	A. Ayyamperumal, Asst. Professor Agricultural Botany
233.	24.2.80	Vivasaya Arangam-Pulses in rice fallows	R. S. Annappan, Professor of Pulses
234.	25 2.80	Puduvai Ponni	—
235.	27 2.80	Farm School on AIR-Intercrop and mixed crop of pulses	Dr. S. Ramiah, Assoc. Professor Agronomy
236.	2.3.80	Vivasaya Arangam - Intercrop and mixed crop of pulses	Dr. S. Ramiah, Assoc. Professor Agronomy
237.	5 3.80	Farm School on AIR - Bio-fertilizers for pulses	Dr. Rangarajan, Assoc. Professor Microbiology
238.	6.3.80	Let us think to solve problems-Integrated pest control for cotton	Dr. M. Balasubramanian, Professor & Head Entomology
239.	8.3.80	Vivasaya Seithi Malar-Jathikai	S. Syed, Asst. Professor Horticulture
240.	8.3.80	Co 1 Field beans	P. Sivasubramanian Asst. Professor Agricultural Botany
241.	9.3.80	Vivasaya Arangam-Bio-fertilizers for pulses	Dr. M. Rangarajan, Associate Professor Microbiology
242.	12.3.80	Farm School on AIR-Diseases of pulses	Tmt. Kousalya Gangadharan Assoc. Professor Plant Pathology
243.	15.3.80	Vivasaya Seithi Malar-Co 3 Varagu	N. Sundaresan, Asst. Professor Agricultural Botany

244.	15.3.80	Co 24 Cholam	Dr. M. N. Prasad, Assoc. Professor Agricultural Botany
245.	16.3.80	Vivasaya Arangam-Diseases of pulses	Tmt.Kousalya Gangadharan, Assoc. Professor Plant Pathology
246.	19.4.80	Farm School on AIR-Pests of pulses	P. C. Sundara Babu, Assoc. Professor Entomology
247.	22.3.80	Vivasaya Seithi Malar-An Arecanut variety	T. Thangaraj, Asst. Professor Horticulture
248.	22.3.80	Pepper cultivation	R. Balakrishnan, Asso. Professor Horticulture
249.	23.3.80	Vivasaya Arangam-Pests of pulses	P. C. Sundara Babu, Assoc. Professor Entomology
250.	26.3.80	Farm School on AIR - Pulses-Summary and Questions	R. S. Annappan, Professor of Pulses Agricultural Botany
251.	28.3.80	Vivasaya Seithi Malar-Ragi Aphid	G. Balasubramanian, Asst. Professor Entomology
252.	28.3.80	Insect Hormones on plants	Dr. M. Gopalan, Assoc. Professor Entomology
253.	30.3.80	Vivasaya Arangam - Pluses cultivation - Summary and Questions	R. S. Annappan, Professor of Pulses Agricultural Botany

254.		How to preserve eggs without spoilage for long time	Selvi. G. Manimegalai
255.		Food technology Chitharam	Dr. S. Neelakantan
256.		Mycotoxins in food	Tmt. Indra Jasmine
257.		Principles and Practices of Dryland Agriculture	S. R. Chowdappan. Crop Agronomist AICRP. for Dryland Agri. Kovilpatti
258.		Improved varieties of Millets, Pulses and Oilseeds suitable for rainfed black soil tract of the southern districts Tamil Nadu.	Dr. G. Soundrapandian, Crop specialist ACIRP. for Dryland Agrl. Kovilpatti
259.		Achievements in Dryland Agriculuture	S. R. Chowdappan, Crop Agronomist AICRP. for Dryland Agrl. Kovilpatti
260.	15.11.79	Feature on the activities of Horticultural Research Station. Kodaikanal.	
261.		Pineapple cultivation	M. Kulasekaran, Associate Professor Faculty of Horticulture
262.	16.8.79	New turn in cotton cultivation	Dr. A. Chamy, Associate Professor& Head Cotton Research Station Srivilliputhur.
263.		A new groundnut for rainfed culture	Dr. S. Thangavelu, Dept. of Agrl. Botany.
264.		Irrigated Gingelly	Dr. S. Thangavelu, Dept. of Agrl. Botany.

265.		Hints on cashew cultivation	Thiru· V. Palaniswamy, Dept. of Harticulture
266.		Feature :on cashew Research Station	Cashew Research Station
267.		Plant protection for rice	Asst. Professor (Entomology) KVK., Pondichery.
268.		Puduvai Ponni in Samba	Asst. Professor (Rice) KVK., Pondichery.
269.		Rice varieties suited to Sornavari	Asst. Professor (Rice) KVK., Pondichery.
270.		Calf rearing	U. Mohalingam, Asst. Professor of Dairy Science. Vet. College, Madras.
271.		Chank Fishing in Tuticorin	K. Venkataramanujam and P. Jayachandran Fisheries, College, Tuticorin.
272.	May '79,	Soil Physical properties	Dr. P. Kandaswamy, Dept. of Soil Science&Agrl. Chemistry.
273.	Aug. '79.	Economic use of fertilizers,	Thiru. C.N. Venkataraman, Dept. of SS & AC.
274.	Aug. '79,	Organic manures	Dr. Rani Perumal, Dept. of SS & AC.
275.	Nov. '79,	Soil - Answers to farmer's Questions	Dr. P. Kandaswamy, Dept. of S4 & AC.
276.		Poochigalum puzhukkalum peruthathu yen?	Dr. S. Jayaraj
277.		Pugaiyanum, Prodeniavum	Dr. S. Jayaraj

278.		Feature programme about the Dept. Agrl. Entomology.	Staff and P. G. students
279.		Control of black headed caterpillar, *Nephantis serinopa on* coconut	Dr. V. T. Sundaramurthy,
280.	Nov. '79,	New Seed Planter	Asst. Professor (FM & I) Trichy.
281.		Talk on Bhendi and Onion	Dr. V. D. Guruswamy Raja, Profeseor and Head
282.		Talk on New varieties of Chillies	Dr. S. Rajasekaran, Associate Profsssor
283.		Talk on Pulses	Thiru. N. Sivasamy, Assistant Professor

APPENDIX VIII

LIST OF ON GOING PROJECTS

There are about 1800 research projects in various branches of agricultural sciences under the University and other Co-ordinated Research Projects financed by Indian Council of Agricultural Research, ICSSR, UGC, DST, DES and other agencies, the list of which is furnished in the following pages. The projects have been divided into 34 series and each series represents a particular station as indicated below:

R. 1 Series - Agricultural College and Research Institute and College of Agricultural Engineering, Coimbatore

R. 2 Series - Agricultural College and Research Institute, Madurai

R. 3 Series - Agricultural Research Station, Bhavanisagar

R. 4 Series - Agricultural Research Station, Aliyarnagar

R. 5 Series - Groundnut Researah Station, Pollachi

R. 6 Series - Hortcultural Research Station, Periyakulam

R. 7 Series - Horticultural Research Station, Kodaikanal

R. 8 Series - Regional Research Station, Kaveripattinam

R. 9 Series - ICAR Schemes at Aduthurai

R. 10 Series - Regional Coconut Research Station, Veppankulam

R. 11 Series - Regional Coconut Research Station, Coconut Wilt Disease Scheme, Muthupet

R. 12 Series - Wetland Banana Research Station, Uyyakondanthirumalai

R. 13 Series - Sugarcane Research Station, Cuddalore

R. 14 Series - Cashew Research Station, Vriddhachalam

R. 15 Series - ICAR Schemes at Tindivanam

R. 16 Series - Castor Research Station, Salem

R. 17 Series - ICAR Schemes at Kovilpatti

R. 18 Series - ICAR Schemes at Srivilliputhur

R. 19 Series - Krishi Vigyan Kendra, Pondicherry

R. 20 Series - Horticultural Research Station, Thadiyankudisai

R. 21 Series - Horticultural Research Station, Yercaud

R. 22 Series - Forestry Research Station, Mettupalayam

R. 23 Series - ICAR Scheme at Coonoor

R. 24 Series - ICAR Schemes at Vaniyambadi

R. 25 Series - Veterinary College, Madras

R. 26 Series - Animal Husbandry Department, Coimbatore
R. 27 Series - Animal Husbandry Department, Madurai
R. 28 Series - Schemes at Sheep Breeding Research Station, Sandynallah
R. 29 Series - Schemes at Sheep Research Station, Kolathur
R. 30 Series - Betelvine Scheme, Velur
R. 31 Series - Fisheries College, Tuticorin
R. 32 Series - Kumaraperumal Farm Science Centre. Tiruchirapalli
R. 33 Series - Livestock Research Station, Kattupakkam
R. 34 Series - Poultry Research Station, Teynampet

The projects have been numbered in two categories viz., fundamental projects (101 to 200 series) and field oriented projects (from 201 upwards) The serial numbers of each project is prefixed with an abbreviation to indicate the departments concerned.

The following is the list of on going projects now in progress during the period under report.

AGRICULTURAL COLLEGE AND RESEARCH INSTITUTE, COIMBATORE

AGRICULTURAL BOTANY

R. 1 Ag. Bot. 101 Evaluation of germplasm of rice
C. Murugarajendran

R. 1. Ag. Bot. 105 Evaluation of germplasm bank in cumbu
C. Nagarajan

R. 1. Ag. Bot. 106 Evaluation of germplasm bank of tenai, sami and panivaragu
C. Nagarajan

R. 1. Ag. Bot. 107 Evaluation of germplasm bank of varagu and ragi
N. Sundaresan

R. 1. Ag. Bot. 112 Evaluation of germplasm stock of *G. hirsutum* and *G. barbadense*
K. S. Jehangir

R. 1. Ag. Bot. 133 Development of new male sterile lines in cumbu
N. Sunderesan

R. 1. Ag. Bot. 205 Evolving high yielding variety of 120 to 140 days duration possessing high degree of resistance to major pests and diseases of rice in Tamil Nadu
J. Chandramohan

R. 1. Ag. Bot. 207 Evolving an early variety of rice maturing in less than 100 days and combining high yield and resistance to major pests and diseases of rice in Tamil Nadu
T. B. Renganathan

R. 1. Ag. Bot. 215 Evolving short duration sorghum hybrids suitable for summer irrigated season
M. N. Prasad

R. 1. Ag. Bot. 216 Evolution of superior varieties of sorghum suited to summer irrigated season
G. A. Palanisamy

R. 1. Ag. Bot. 217 Development of superior hybrids of sorghum suited to early (south west) monsoon season
M. N. Prasad

R. 1. Ag. Bot. 218 Evolving superior varieties of sorghum suited to early (South West) monsoon season
G. A. Palanisamy

R. 1. Ag. Bot. 222 Development of superior cumbu hybrids with a duration of 85-90 days suitable for irrigated and rainfed conditions
C. Nagarajan

R. 1. Ag. Bot. 224 Evolving high yielding short duration strains of ragi
N. Sundaresan

R. 1. Ag. Bot. 227 Evoluion high yielding and short duration strains of minor millets
K. Madhivanan

R. 1. Ag. Bot. 230 Development of maize hybrids suitable for irrigated and rainfed cropping
Sayed Nazir

R. 1. Ag. Bot. 231 Identification of wheat genotypes for Tamil Nadu
Sayed Nazir

R. 1. Ag. Bot. 232 Evolving a variety of cotton with 150 days duration
M. Kadambavana Sundram

R. 1. Ag. Bot. 233 Evolving a *G. hirsutum* cotton for rainfed black soil
R. Rajagopalan

R. 1. Ag. Bot. 237 Synthesising on inter specific hybrid cotton
P. S. Chandramathy

R. 1. Ag. Bot. 240 Recombination breeding in groundnuts through infra-specific hybridization
T. K. Ramachandran

R. 1. Ag. Bot. 241 Improvement of groundnut cultivars through introgression of characteristics from wild genoplasm
V. S. Raman

R. 1. Ag. Bot. 242 genetic improvement of *sesame* for yield, *adaptability* and resistance
A. N. Venkateswaran

R. 1. Ag. Bot. 269 Evolving a variety of 160-180 days duration with high yield potential and resistance to major pests and diseases of rice in Tamil Nadu
P. Sivasubramaniam

R. 1. Ag. Bot. 272 Breeding of rice varieties with tolerance to adverse soil conditions
Sukanya Subramaniam

R. 1. Ag. Bot. 277 Evolving high yielding variety of 100 - 120 days duration possessing high degree of resistance to major pests and diseases of rice in Tamil Nadu
C. Murugarajendran

R. 1. Ag. Bot. 278 Evolving a rice variety of 140 - 160 days duration with high yield potential possessing high degree of resistance to major pests and diseases of rice in Tamil Nadu
P. Sivasubramanian

R. 1. Ag. Bot. 284 Evolution of new groundnuts through induced mutagenesis
M. R. Sivaram

R. 1. Ag. Bot. 287 Mutation breeding of high yield, high oil content, short duration and dwarf habit in castor
M. Subramanian

R. 1. Ag. Bot. 288 Development of superior genotypes of safflower through hybridization and induced mutagenesis
S. Suresh

R. 1. Ag. Bot. 291 Induced mutagenesis with high fertility, oil content and stability over different locations in sunflower
G. Purushothaman

R. 1. Ag. Bot. 293 Study of variation with a varietal population for isolating elite plants in sunflower
G. Purushothaman

R. 1. Ag. Bot. 294 Building up of synthetics and hybrids in sunflower
G. Purushothaman

R. 1. Ag. Bot. 295 Evolving of germplasm bank in sunflower through biometrical technique
M. K. Ayyasamy

R. 1. Ag. Bot. 296 Evolution of high yielding varieties of red gram through recombination breeding
M. Vaman Bhat

R. 1. Ag. Bot. 227 Evolution of high yielding varieties of red gram through mutation breeding
M. Vaman Bhat

R. 1. Ag. Bot. 298 Evolution of high yielding varieties of black gram through recombination
P. Shanmugasundaram

R. 1. Ag. Bot. 299 Evolution of high yielding varieties of black gram through mutation breeding
P. Shanmugasundaram

R. 1. Ag. Bot. 300 Evolution of high yielding vegetable cum grain purpose lab-lab through recombination breeding
R. Ravichandran

R. 1. Ag. Bot. 302 Evolution of high yielding varieties greengram through mutation breeding
R. Ravichandran

R. 1. Ag. Bot. 303 Evolution of high yielding varieties of bengalgram through recombination breeding
S. Giridharan

R. 1. Ag. Bot. 304 Evolution of high yielding vegetable cum grain cowpea for irrigated condition through conventional breeding
U. Selvaraj

R. 1. Ag. Bot. 310 Evaluation of superior varieties of mesta in yield and quality of fibre
K. Paramasivam

R. 1. Ag. Bot. 312 Evaluation of superior varieties of sunhemp in yield and quality of fibre
K. Paramasivam

R. 1. Ag. Bot. 330 Including variability through mutagenesis in *Pennisetum typhoides*
R. Appadurai

R. 1. Ag. Bot. 335 Evaluation of superior varieties of jute in yield and quality of fibre
R. Paramasivam

R. 1. Ag. Bot. 339 Studies of induced mutagenesis in groundnut (*Arachis hypogae* L.)
R. Rathnasamy

R. 1. Ag. Bot. 349 Breeding for multiple resistance to diseases and pests in cumbu
R. Appadurai

R. 1. Ag. Bot. 351 Evolving improved strain of groundnut with multiple resistance to pests, diseases and tolerance to adverse soil and climatic conditions
R. Appadurai

R. 1. Ag. Bot. 353 Development of improved sunflower stains with multiple resistance to pests and diseases and tolerance to adverse soil and climatic conditions
R. Appadurai

R. 1. Ag. Bot. 354 Breeding cotton varieties with multiple resistance to pests and diseases with tolerance to drought
S. Kamalanathan

R. 1. Ag. Bot. 361 Evolution of high yielding Soybean through recombination breeding
A. Ayyamperumal

AGRONOMY

R. 1. Agron. 201 Formulation of package of pratices of rice
C. T. Natarajan

R. 1. Agron 202 Formulation of package of practices on cholam
S. Subbarayalu

R 1. Agron. 203 Formulation of package of practices on cotton
M R. Iruthayaraj

R. 1. Agron. 204 Formulation of package of practices on seasamum
G Venakatesan

R. 1. Agron. 205 Formulation of package of practices on sunflower
S. Rajaram

R. 1. Agron. 206 Formulation of package of practices on safflower
D. Arunachalam

R. 1. Agron. 207 Formulation of package of practices on jute and allied fibres
P. K. Rangiah

R. 1. Agron. 208 Formulation of package of practices on wheat
K. P. Ramasamy

R. 1. Agron. 209 Formulation of package of practices on blackgram
S. Ramiah

R. 1. Agron. 210 Formulation of package of practices on greengram
S. Ramiah

R. 1. Agron. 211 Formulation of package of practices on redgram
S. Ramiah

R. 1. Agron. 212 Formulation of package of practices on bengalgram
S. Ramiah

R. 1. Agron. 213 Formulation of package of practices on cowpea
S. Ramiah

R. 1. Agron. 214 Formulation of package of practices on lucerne
V. S. Shanmugasundarm

R. 1. Agron. 215 Production potential in forage crops
V. S. Shanmugasundaram

R. 1. Agron. 216 Maximisation of ragi production and economics of package of practices
T. S. Theetharappan

R. 1. Agron. 217 Maximisation of maize production and economics of package of practices
T. K. Gopala Rao

R. 1. Agron. 218 Maximisation of cumbu production and economics of package of practices
N. Gopalasamy

R. 1. Agron. 219 Systems of cropping in garden lands
Sp. Palaniappan

R. 1. Agron. 221 Forecast of pests and diseases
R. Kulandaivelu

R. 1. Agron. 222 Control of Parthenium
A. Damodaran

SOIL SCIENCE AND AGRICULTURAL CHEMISTRY

R. 1. SS & AC. 203 Studies on the comparative efficiencies of different sources of micronutrients and methods of application of micronutrients
G. Ramanathan

R. 1. SS & AC. 204 Effect of mixed cropping on the physico-chemical properties of soil and yield of crops
R. Nagaraj

R. 1. SS & AC. 211 Production of cytoplasmic protein from various leaf protein sources and their economic utilization
L. Devarajan

R. 1. SS & AC. 221 (a) Delineation of regions for micronutrient deficiency (b) Effect of continuous cropping on depletion of micronutrients
G. Ramanathan

R. 1. SS & AC. 222 Studies on the improvement of physical properties of soil having impervious layer at shallow depth
C. Jayaraman

R. 1. SS & AC. 223 All India Coordinated Project on Long Term Fertilizer Experiments
T. S. Manickam

R. 1. SS & AC. 224 All India Coordinated Project for Research on Forage crops
C. R. Lakshminarasimhan

R. 1 SS & AC. 225 Chemical studies in All India Coordinated Agronomic experiments schemes
G. Selvakumari

R. 1. SS & AC. 228 Indian Council of Agricultural Research Coordinated Scheme for investigation of Soil Test with Crop Response
Rani Perumal

R. 1. SS & AC. 235 Soil Test Crop Response studies with cotton
M. Shanmugam

R. 1. SS & AC. 239 Methods of reclamation of salinity and alkalinity developed in different types of soil
V. S. Kriahnamurthy

R. 1. SS & AC. 242 Permanent Manurial Trials
K. Sankaran

R. 1. SS & AC. 243 Studies on depletion of soil potassium
K. M. Ramanathan

R. 1. SS & AC. 247 Studies on the mineralisation of slow acting fertilizers and the effect of nitrification inhibitors on the transformation of soil nitrogen
S. Subbiah

R. 1. SS & AC. 251 Studies on the extraction of bran oil from various varieties of paddy
A. Raja Rajan

R. 1. SS & AC. 252 Effect of continuos application of micronutrients on toxicity and residual properties of soil
P. Savithri

R. 1. SS & AC. 255 Studies on the methods of nitrogen fixation (accumulation) in soils by the addition of organic matter and phosphorus
K. Andi

R. 1. SS & AC. 257 Studies on the uptake of major nutrients by important vegetable crops
R. Krishnaswamy

R. 1. SS & AC. 258 Improvement of soil fertility as influenced by best crop rotation
K. Kumaraswamy

R. 1. SS & AC. 259 Zinc nutrition of rice
V. S. Krishnamurthy

R. 1. SS & AC. 262 Studies on the recycling and rational utilisation of organic wastes
J. Heikiah

R, 1. SS & AC. 264 Potassium Fertilization of Crops (GDR Experiment)
K. M. Ramanathan

R. 1. SS & AC. 265	Studies on the depletion and efficient utilisation of nitrogen *K. Natarajan*
R. 1. SS & AC. 266	Mixed cropping and the uptake of nutrients *P. Savithri*
R. 1. SS & AC. 267	Studies on the movement and depletion of phosphorus in various soils *R. Surendiran*
R. 1. SS & AC. 269	Effect of P, K and FYM on physico-chemical properties of the soil and yield components of crops in a fixed single year two crop rotation *K. K. Krishnamoorthy*
R. 1. SS & AC. 270	Studies on the iron nutrition of flower crops using tracer techniques *T. L. Subramanian*
R. 1. SS & AC. 271	Studies on phosphorus nutrition with special reference to pulses under different soil conditions *D. Raj*
R. 1. SS & AC. 272	Transformation, immobilisation and availability of phosphorus in rice soils *K. Kumaraswamy*
R. 1. SS & AC. 273	Effect of irrigation waters of different quality on the soils of Tamil Nadu *A. Rajamannar*
R. 1. SS & AC. 276	Study on the effect of agronomic and plant protection practices on the oil, protein content and uptake of nutients by sesamum crop *A. Gopalswamy*
R. 1. SS & AC. 277	Study on the variability in the chemical composition of genetic stocks of sesamum *A. Gopalswamy*
R. 1. SS & AC. 275	The effect of gingelly crop on nutrient depletion and consequent effect on the succeeding crops *D. Raj*
R. 1. SS & AC. 278	Effect of triacontanol on crop yields *S. Subbiah*
R. 1. SS & AC. 279	Studies on the effect of different mulches on crop growth, yield and properties of soils *J. Helkiah*

R. 1. SS & AC. 280 Scheme for studies on the physico-chemical properties of saline sodic soils with special reference to uptake of macro and micronutrients
V. S. Krishnamurthy

R. 1. SS & AC. 281 Response of sorghum varieties to different modes of application of iron
N. Nagalakshmi

R. 1. SS & AC. 282 Studies on the yield and nutrient uptake of lucerne as influenced by phosphorus and micronutrient fertilization
K. Nagalakshmi

R. 1. SS & AC. 283 Effect of bio-fertilizers in combination with micronutrients on rice yield and on nitrogen economy
A. Chandrasekaran

R. 1. SS & AC. 284 Studies on urea and sulphur application on yield of crops in comparison with ammonium sulphate
A. Chandrasekaran

R. 1. SS & AC. 285 Phosphorus nutrition of pulse crops in combination with micronutrients
R. Krishnasamy

R. 1. SS & AC. 286 influence of N x K interaction on nutrient uptake, yield and quality of chilli
K. Subbiah

R. 1. SS & AC. 287 Studies on soil test methods and correlation with crop response with particular reference to micronutrients for common cultivated crops
L. Devarajan

R. 1. SS & AC. 288 Influence of fertilization on yield and quality of tomato varieties/cultures
M. Boopathy

R. 1. SS & AC. 289 Evaluation of crops for their suitability to soils treated with sewage waste
A. Raja Rajan

R. 1. SS & AC. 290 Studies on the influence of different factors on the content and quality of oil in cotton seed
R. Surendiran

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K. Natarajan

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R. Surendiran

R. 1. SS & AC. 291 Micronutrient nutrition of groundnut varieties/cultures with special reference to soil condition and method of application
M. Boopathy

R. 1. SS& AC. 292 Standardisation of methods for estimation of Lead
K. Andi

R. 1. SS& AC. 293 Effect of N application on the accumulation of nitrate in forage crops
C. R. Lakshminarasimhan

R. 1. SS & AC. 294 Effect of continuous cropping and fertilisation on the avaibility of major plant nutrients and uptake by crop
C. K. Rajagopal

R. 1. SS & AC. 295 Radio-Tracter Studies on Soil Organic Matter
A. Raja Rajan

R. 1. SS & AC. 296 Influence of some pesticides on different soil types and plant relationship
P. Vasudevan

R. 1. SS & AC. 297 Standardisation of techniques for autoradiography and for increasing efficiency of counting systems
A. Rajamannar

R. 1. SS & AC. 298 Studies on mobilisation of added-P upon application of organic amendments
K. Natarajan

R. 1. SS & AC. 299 Nutrition of groundnut with particular reference to secondary nutrients
S. Ramanathan

R. 1. SS & AC. 300 Studies on soil amendment - fertilizer amendment practices for salt affected soils
S. Ramanathan

R. 1. SS & AC. 301 Diagnostic evaluation of iron deficiency and follow-up recommendation for correction of iron deficiency
N. Nagasundaram

R. 1. SS & AC. 302 Studies on the effect of graded doses of micronutrients on the yield and quality of chillies
K. Subbiah

R. 1. SS & AC. 303	Studies on the effect of different levels, method and time of application of K fertilizer on cereal crops *S. Mani*
R. 1. SS & AC. 304	Influence of organic and inorganic fertilizers on plant growth, yield and quality of some important vegetables *S. Mani*
R. 1. SS & AC. 305	Studies on the effect of micronutrients on seed cotton yield and quality of fibre of different cotton varieties grown in different agro-climatic region *N. Nagasundaram*
R. 1. SS & AC. 306	Effect of soil applied micronutrients on growth, yield and quality of Cassava (Minihot esculenta) *N. Nagasundaram*
R. 1. SS & AC. 307	Effect of interaction of nitrogen and sulphur in rice crop *N. Kanakabushani*
R. 1. SS & AC. 308	Effect of foliar application of K fertilizer on yield and quality of Bhendi *S. Mani*
R. 1. SS & AC. 309	Monitoring the nutrient availability under continuous fertization and cropping (Rice) *K. Subbiah*
R. 1. SS & AC. 310	Varietal screening for micronutrient stress and studies, related to mechanism of Tolerance *P. S. Srinivasan*
R. 1. SS & AC. 311	Studies on Micronutrient interation in Rice *P. S. Srinivasan*

AGRICULTURAL ENTOMOLOGY

R. 1. Ag. Ent. 210	Control of pod borers in redgram *P. C. Sundara Babu*
R. 1. Ag. Ent. 211	Study of varietal resistance to aphids in lablab *B. Rajasekaran*
R. 1, Ag.,Ent. 212	Control of major pests of bhendi *M. Gopalan*
R. 1. Ag. Ent. 213	Control of major pests of brinjal *A. Azeez Basha*

R. 1. Ag. Ent. 273 Studies on the combination of insecticide, fertilizer and micronutrient
Sivagami Vadivelu

R. 1. Ag. Ent. 275 Studies on the utility of different light traps for the control of crop pests
R. Natesan

R. 1. Ag. Ent. 276 Control of cumbu earhead midge.
G. Santharam

R. 1. Ag. Ent. 277 Studies on screening of plants for antifeedant and juvenile hormone and their role in insect control
M. Gopalan

R. 1. Ag. Ent. 278 Studies on aphids of ragi and its control
G. Balasubramanian

R. 1. Ag. Bot. 281 Integrated control of cotton pests
S. Parameswaran

R. 1. Ag. Ent. 282 Investigations on the resistance to pesticides developed in *Heliothis armigera* and *Spodoptera litura* in relation to biotype and ecology
M. Balasubramanian

R. 1. Ag. Ent. 283 Evaluation of chilli types and breeding for resistance to thrips.
V. Manoharan

R. 1. Ag. Ent. 284 Breeding rice varieties for resistance to Brown plant-hopper
S. Chelliah

R, 1. Ag. Ent 285 Development of rice varieties for resistance to leaf folder
R. Velusamy

PLANT PATHOLOGY

R. 1. Pl. Path. 202 Control of diseases of maize
B. Ramaraj

R. 1. Pl. Path. 206 Control of major diseases of bhendi, tomato and brinjal
A. Venkata Rao

R. 1. Pl. Path. 209 Investigations on the diseases of ornamental crops
Lakshmi Ramakrishnan

R. 1. Pl. Path. 212	**Mushroom cultivation** *R. Seetharaman*
R. 1. Pl. Path. 213	**Studies on rice diseases with particular reference to screening for disease resistance and control** *V. Mariappan*
R. 1. Pl. Path. 215	**Diseases of cholam and their control measures** *K. Rajagopal*
R. 1. Pl. Path. 216	**Diseases of ragi and cumbu** *M. Muthusamy*
R. 1. Pl. Path. 217	**Screening of varieties of cumb against downy mildew and rust** *M. Muthusamy*
R. 1. Pl. Path. 218	**Control of ragi blast** *M. Muthusamy*
R. 1. Pl. Path. 219	**Control of diseases of minor millets** *M. Muthusamy*
R. 1. Pl. Path. 220	**Studies on cotton diseases** *Thangamani Narayanaswamy*
R. 1. Pl. Path. 221	**Investigations on the control of decay of fruits and vegetables during storage** *C. Paramabaramani*
R. 1. Pl. Path. 222	**Studies on diseases of sesamum** *R. Jeyarajan*
R. 1. Pl. Path. 225	**Studies on virus diseases of groundnut** *P. Narayanasamy*
R. 1. Pl. Path. 226	**Control of diseases of sunflower** *R. Ayyavoo*
R. 1. Pl. Path. 227	**Studies on the role of seed-borne microflora on the quality of seeds** *P. Vidhyasekaran*
R. 1. Pl. Path. 229	**Studies on diseases of crop plants caused by mycoplasma like organisms** *Sabitha Doraiswamy*

R. 1. Pl. Path. 231 Studies on diseases of green gram
Kousalya Gangadharan

R. 1. Pl. Path. 232 Leaf spot and rhizome rot diseases of turmeric
K.T. Subbaraja

R. 1. Pl. Path. 235 Studies on diseases of tuber crops with special reference to tapioca, sweet potato and yams
K. Sivaprakasam

R. 1. Pl. Path. 238 Evolving control measures against diseases of economic forest tree seedlings in nursery.
K. Seetharaman

R. 1. Pl. Path. 242 Studies on seed-borne diseases
P. Vidhyasekaran

R. 1. Pl. Path. 243 Studies on soil borne diseases with particular reference to cotton root rot caused by *Rhizoctonia solani*
A. Vinayagamurthy

R. 1. Pl. Path. 246 Diseases of tomato and cucurbits
T.K. Kandaswamy

R. 1. Pl. Path. 252 Studies on head moulds of cholam
B. Ramaraj

R. 1. Pl. Path. 253 Studies on bacterial blight of cotton
Thangamani Narayanaswamy

R. 1. Pl. Patn. 254 Studies on Verticillium wilt of cotton
A. Vinayagamurthy

R. 1. Pl. Path. 256 Studies on root diseases of sesamum
R Jeyarajan

R. 1. Pl. Path. 257 Studies on phyllody diseases of sesamum
M. S. Balakumar

R. 1. Pl. Path. 258 Evaluation of sesamum varieties for resistance to impor tant diseases of sesamum
M. S. Balakumar

R. 1. Pl. Path. 259 Evolving an integrated control of sesamum diseases
M. S. Balakumar

R. 1. Pl. Path. 260 Evolving an integrated control of diseases of groundnut
P. Narayanaswamy

R. 1. Pl. Path. 261	Studies on rust diseases of groundnut *M. Ramiah*
R. 1. Pl. Path. 262	Studies on Tikka and other leaf spot diseases of groundnut *M. Ramiah*
R. 1. Pl. Path. 263	Studies on diseases of cowpea and horsegram *Kousalya Gangadharan*
R. 1. Pl. Path. 264	Studies on diseases of redgram *Kousalya Gangadharan*
R. 1. Pl. Path. 265	Studies on diseases of bengalgram *G. Krishnamohan*
R. 1. Pl. Path. 266	Studies on diseases of pulses (Lab lab niger) *G. Krishnamohan*
R. 1. Pl. Path. 267	Studies on diseases of blackgram *G. Krishnamohan*
R. 1. Pl. Path. 269	Rice tungro virus disease *V. Mariappan*
R. 1. Pl. Path. 270	Studies on the sheath rot disease of rice *P. Durairaj*
R. 1. Pl. Path. 271	Studies on the control of bacterial blight disease of rice *P. Durairaj*

SEED TECHNOLOGY

R.1.Seed Tech. 101	Standardising seed testing procedures and vigour assessment techniques for coffee, cardamom, pepper, pulses and oilseeds *V. Ramakrishnan*
R.1.Seed Tech. 201	Standardising quality seed production in sorghum *G. Thulasidas*
R.1.Seed Tech. 202	Evolving suitable techniques for the production, processing and storing of parental and hybrid seeds of bajra and maize *K. R. Ramaswamy*
R.1.Seed Tech. 203	Studies on standardisation of seed production techniques in tomato *K. R. Ramaswamy*

R.1.Seed Tech. 204 Standardisation of seed production techniques in brinjal
G. Thulasidas

R.1.Seed Tech. 205 Evolving suitable package of practices for quality seed production in okra (bhendi)
K. R. Ramaswamy

R.1.Seed Tech. 206 To determine the package of practices for seed production in cucurbits and onions
K. R. Ramaswamy

R.1.Seed Tech. 207 Studies on seed production technology in cotton
C. P. Thiagarajan

R.1.Seed Tech. 208 Studies on seed production technology in redgram
V. Ramakrishnan

R.1.Seed Tech. 209 Evolving suitables package of practices for the prodoution of quality seed in blackgram and green gram
V. Ramakrishnan

R.1.Seed Tech. 210 Standardisation of seed production technology in green gram
T. V. Karivaràtharaju

R.1.Seed Tech. 211 Standardisation of seed production technology in bengalgram
T. V. Karivaratharaju

R.1.Seed Tech. 212 Standardisation of seed production technology in gingelly
C. Dharmalingam

R.1 Seed Tech. 213 Studies on seed production in sunflower
K. K. Vadivelu

R.1.Seed Tech. 214 Standardisation of seed production technology in groundnut
C Dharmalingam

R.1.Seed Tech. 215 Studies on seed production technology in coffee
V. Ramakrishnan

R.1.Seed Tech. 216 Studies on viability and storage of cardamom seeds
V. Ramakrishnan

R.1.Seed Tech. 217 Standardisation on seed viability and storage of black pepper seeds
K. R. Ramaswamy

R.1.Seed Tech. 218 **Studies on seed production technology in chillies**
V. Ramakrishnan

R.1.Seed Tech. 219 **Studies on seed production technology in paddy**
G. Thulasidas

R.1.Seed Tech. 220 **Tamil Nadu Agricultural University Co-ordinated research project on seed production technology in paddy, cotton, redgram, groundnut, brinjal, tomato, bhendi and hybrids of sorghum and bajra**
K. R. Ramaswamy

R.1 Seed Tech. 221 Studies on the production, processing and storage of seeds of *Cenchrus ciliaris* Linn. (Kolukkattai grass).
K. R. Ramaswamy

FORAGES

R. 1. Forage 201 Studies on inter-specific hybridisation in the genus sorghum for improving tillering and hardness
N. R. Chandrasekharan

R. 1. Forage 202 Breeding for evolution of juicy stalked fodder cholam strains of short duration
N. R. Chandrasekharan

R. 1. Forage 203 Introduction and evaluation of varieties of plant materials likely to be useful as fodder and forage crops
P. Vaidyanathan

R. 1. Forage 204 Synthesis of new hybrid varieties in Cumbu-Napier (*Pennisetum typhoids* x *P. purpurem*) and assessment of existing ones for fodder
P. Chandrasekharan

R. 1. Forage 205 Induced mutagenesis in Guinea grass (*Panicum maximum* and Para grass (*Brachiaria mutica*) and isolation of better clones
I. Henry Louis

R. 1. Forage 206 Breeding superior varieties of Kolukkattai (*buffel*) grass (*Cenchrus* sp) and assessing their forage potential
P. Vaidyanathan

R. 1. Forage 207 Evolving superior forage types in Dinanath grass (*P. pedicellatum*) by induced mutagenesis and selection
A. K. Fazlulla Khan

R. 1. Forage 209 Evolution of high yielding Cowpea (*Vigna sinesis*) varieties for fodder
A. Gopalan

R. 1. Forage 211 Studies on the Forage Potential of (*Leucaena leucocephala*
P. Chandrasekharan

R. 1. Forage 212 Evaluation of *Stylosanthes* species for yield and quality of fodder
M. Paramathma

R. 1. Forage 213 Evaluation and mutuation breeding in cultivated and wild species of Dolichus for fodder yield and quality
A. Gopalan

R. 1. Forage 214 Evaluation and induced mutagenesis of spear grass (*Hetero-pogon contortus*) and marvel grass (*Dicanthium annulatum*) and evolving superior forage types
M. Paramathma

R. 1. Forage 215 Breeding superior forage maize varieties and hybrids
N. R. Chandrasekharan

R. 1. Forage 216 Breeding, selection and introduction in *Clitoria ternatea* and *Desmodium* sp.
M. Paramathma

MICROBIOLOGY

R.1.Ag. Micro. 201 Influence of various soil factors on the survival and nitrogen fixation of rhizobia
M. Rangarajan

R.1.Ag. Micro. 202 Mapping of rhizobial distribution in different regions of Tamil Nadu
J. Prabakaran

R.1.Ag. Micro. 203 Development of rhizobial strains suitable for soils under stress conditions
J. Prabakaran

R.1.Ag. Micro. 204 Interaction of pelletting and binding agents with the seed dressing chemicals and their effects on rhizobia
J. Prabakaran

R.1.Ag. Micro. 205 Rhizobium inoculation studies on clusterbeans
T. Natarajan

R.1.Ag. Micro. 206 Developments of rhizobial inoculants for *Leucaena* and *Stylosanthes*
P. Santhanakrishnan

R.1.Ag. Micro. 207 Interrelationship between rhizobia and forage legumes in relation to efficient nitrogen fixation
G. Oblisami

R.1. Ag.Micro. 208 Studies on biological nitrogen fixation by *Azospirillum*
D. Purushothaman

R.1. Ag.Micro. 209 Studies on crop response to *Azospirillum* inoculation
D. Purushothaman

R.1. Ag.Micro. 210 Efforts of various stress conditions on the growth and nitrogen fixation by *Spirillum lipoferum*
M. Thangaraju

R.1. Ag.Micro. 211 Studies on the occurence of free living and associative symbiotic N_2 fixing bacteria in the rhizosphere and phyllosphere of ragi and cumbu
S. Gunasekaran

R.1. Ag.Micro. 212 Studies on the phyllosphere microorganisms in dinitrogen fixation
S. Gunasekaran

R.1. Ag.Micro. 213 Studies on non-symbotic nitrogen fixation in groundnut
S. Gunasekaran

R.1. Ag.Micro. 214 Studies on nitrogen fixation by blue-green algae in rice crop and rice field
P. Santhanakrishnan

R.1. Ag.Micro 215 Studies on *Azolla-Anabaena* symbiosis and nitrogen fixation under rice field conditions
SP. Sundaram

R.1. Ag.Micro. 2'6 Effect of combined inoculants in crop production
T. Natarajan

R.1. Ag.Micro. 217 Studies on non-symbiotic nitrogen fixation in bhendi and amaranthus crops
P. Santhanakrishnan

R.1. Ag.Micro 218 Effect of bacterial inoculants on Amaranthus
G. Oblisami

R.1. Ag.Micro. 219 Studies on the epiphytic microorganisms in providing nitrogen nutrition to fodder grasses
P. Muthukrishnan

R.1. Ag.Micro. 220 Studies on interaction between VA-mycorrhiza and legumes
P. Muthukrishnan

R.1. Ag.Micro. 221 Studies on the occurence and activity of VA-mycorrhiza in cereal crops
P. Muthukrishnan

R.1. Ag.Micro. 222 Symbiotic association between non-leguminous plants and micro-symbiont with special reference to nitrogen fixation
D. Kandasamy

R.1. Ag.Micro. 223 Studies on the interaction between harmful and beneficial microorganisms on cotton, rice and groundnut
SP. Sundaram

R.1. Ag.Micro. 224 Effect of organic mulches on microbial activity under zero tillage conditions
T. Natarajan

R.1. Ag.Micro. 225 Effect of herbicides on soil microorganisms and their biodegradation
D. Kandasamy

R.1. Ag.Micro. 276 Effect of cement dust pollutants on the crop systems and beneficial microorganisms
R. Narayanan

R.1. Ag.Micro. 227 Physiochemical and biological properties on soil microorganisms and crop systems of SPIC effluents and their efffects
R. Narayanan

R.1. Ag.Micro. 228 Effect of different industrial effluents on soil nitrification process
R. Narayanan

R.1. Ag.Micro. 229 Survey of pollution of river systems and under ground water sources by effluents of industries like Mettur chemicals, Tannery and chemplast industries and the biodegradation of toxic chemicals present in the effluents of these industries
G. Rajannan

R.1. Ag.Micro. 230 Physio-chemicals and biological properties of tannery solid waste (beam house waste) and effluent and their effect on soil microorganisms
G. Rajannan

R.1. Ag.Micro. 231 Treatment of tannery effluents
G. Rajannan

R.1. Ag.Micro. 232 Effect of sago effluents on crops (Maize, ragi and rice) and soil-microbe interrelationship
P. Doraisamy

R.1. Ag.Micro. 233 Utilization of Sago factory effuents for the growth of single cell p·otein producing organisms
P. Doraisamy

R.1. Ag.Micro. 234 Treatment of sago factory effuents
P. Doraisamy

R.1. Ag.Micro. 235 Microbial degradation of farm wastes for biogas generation
P. Rajasekaran

R.1. Ag.Micro. 236 Studies on microbial retting of Jute and Mesta
P. Rajasekaran

R.1. Ag.Micro. 101 Rhizobial serotypes in relation to nodulation and yield of pulses
M. Rangarajan

R.1. Ag.Micro. 102 Screening of germplasm collection of rice for their response to nitrogen fixing organisms
SP. Sundaram

R.1. Ag.Micro. 103 Transfer of nif genes from *Rhizobium* sp into other non-nitrogen fixing microorganisms in maize and tomato plants
S. Jayachandran

R.1. Ag.Micro 104 Development of derepressed and pesticide resistant mutants of *Rhizobium* sp and *Azospirillum*
S. Jayachandran

R.1. Ag.Micro. 105 Nitrogen fixing ability of *Rhizobium* in homologous and heterologous legume hosts in tissue culture
M. Thangaraju

R.1. Ag.Micro. 106 Role of lipopolysaccharides and lectins in legume *Rhizobium* symbiosis
M. Thangaraju

BIOLOGY

R. 1. Biol. 201 Induction of Mutation on Mulberry silkworm for isolation of economic character
N.V. Radha

R. 1. Biol. 202 Studies on the ecology of honey bees
R. Mohan

R. 1. Biol. 226 Investigation on the ecology and biology of certain birds of agricultural importance
R. Mohan

R. 1. Biol. 327 Rice-ecological studies on nematodes
T.S. Muthukrishnan

R. 1. Biol. 231 Effect of pollution on Soil Ecosystem
Rajeswari Sundarababu

R. 1. Biol. 102 Evolving virus free material with the aid of tissue culture technique
C. Padmanabhan

R. 1. Biol. 105 Production of haploid plant by adopting anther culture in banana and other plant species
Manimekalai Gurunathan

R. 1. Biol. 106 Studies on Erisilkworm
Md. Kaleemur Rehman

R. 1. Biol. 107 Studies on the role of Oligochaetes in Paddy fields
Md. Kaleemur Rehman

R. 1. Biol. 108 Genetic potential of Rice Dwarfs
C. Sundararajan

R. 1. Biol. 109 Genetic differentiation in pulses
A.S Shaumugam

R. 1. Biol. 110 Studies on *invitro* symbiosis of *Rhizobium* with *Arachis* and other pulse crops in callus cultures,
S. Sukumar

R. 1. Biol.	111	Studies on Embryology and pollen morphology of wild and cultivated species of *Carica papaya* *S. Sukumar*
R. 1. Biol.	112	Embryological studies in different wild and cultivated *Oryza sativa* *A. Kalaimani*
R. 1. Biol.	113	Studies on seed coat inhibitors of certain plant crops *A. Kalaimani*
R. 1. Biol.	501	Studies on soil invertebrates of Agricultural Ecosystem *N.V. Radha*
R. 1. Biol.	502	Bio-ecoology studies of dagger nematode *Rajeswari Sundarababu*
R. 1. Biol.	503	*Azolla-Anabaena* symbiosis and their influence on nitrogen economy in rice soil ecosystem *Manimekalai Gurunathan*
R. 1. Biol.	504	Studies on the effect of particular pollutants on crops *C. Padmanabhan*

BIOCHEMISTRY

R. 1. Biochem.	103	Biochemical and Genetic studies of nitrogen fixing bacteria *S. Sadasivam*
R. 1. Biochem.	201	Biochemical aspects of food grains in relation to protein content and their nutritive value *R. Kasthuri*
R. 1. Biochem.	:03	Improvement of manurial quality of Agricultural waste products through bio-chemical means *D. Raj*
R. 1. Biochem.	204	Nutritive value of feeds and fodders with special reference to devising cheap poultry and animal feed substitutes *D. Raj*
R. 1. Biochem.	206	Biochemical studies on the nitrogen fixing algae and fungi *M. Jayapragasam*
R. 1. Biochem.	207	Biochemical studies on sunflower with reference to physical and chemical characteristics of oil and its keeping quality *B. Thayumanavan*

R. 1. Biochem. 208 Biochemical quality of common pulses in relation to their protein content and nutritive value
M. Jayapragasam

R. 1. Biochem. 209 Screening of certain genotypes in Sorghum by enzyme technique
S. Sadasivam

PHYSICAL SCIENCES

R. 1. Biochem. 210 Study of Biochemical components in varieties of tomato in relation to fitness for storage and processing
Themoli Balasubramanian

R. 1. Biochem. 211 Biochemical and enzyme variation in leaves in relation to fruit components of tomato
Themoli Balasubramanian

R. 1. Biochem. 212 Polysaccharide fractionation in common tubers
S. Krishnaveni

R. 1. Biochem. 213 Protein fractionation in Blackgram
S. Krishnaveni

R. 1. Biochem. 214 Biochemical properties of roots leading to susceptibility or resistance to nematode attack
G. Gowri

R. 1. Biochem. 215 Screening of certain pulse varieties for efficiency of nitrogen utilisation in relation to yield
G. Gowri

R. 1. Biochem. 216 Studies on the oil content of sunflower as influenced by environmental agronomical, varietal and genetic factors
B. Thayumanavar

R. 1. Biochem. 217 Studies on pungent principles in chilli
R. Kasthuri

R. 1. Bicchem. 218 Standardisation of extraction and estimation of essentia oils from flowers
M. Indra Raja

R. 1. Biochem. 219 Utilization of pollutants
N. Kamalam

R. 1. Biochem. 220 **Effect of wastes and effluents from Tannin Industries on Ecosystems**
P. Thyagarajan

R. 1. Biochem. 221 **Mercury pollution in soils**
N. Kamalam

R. 1. Biochem. 222 **Characterisation of vegetable oils from unconventional sources**
S. Chellamuthu

R. 1. Biochem. 223 **Studies on the fate of organic matter in cultivated soils of Tamil Nadu**
S. Chellamuthu

PLANT PHYSIOLOGY

R.1. Pl. Physiol. 214 **Investigation on the efficiency of supplementing foliar urea with basal gypsum incorporation to groundnut**
S. Gopalakrishnan

R.1. Pl. Physiol. 215 **Effect of season and environment on grain maturation in rice**
R. Radhakrishnan

R.1. Pl. Physiol. 216 **Studies on certain aspects on the physiology mutation of rice grain**
R. Radhakrishnan

R.1. Pl. Physiol. 217 **Certain aspects of physiology of heterosis in cotton (*Gossypium*)**
M. Thangaraj

R.1. Pl. Physiol. 218 **Physiological basis for the performance of inter-specific hybrid derivative in *Arachis* L.**
Kamala Thirumalaiswamy

R.1. Pl. Physiol. 219 **Study on the absorption potential of potassium and sulphur through foliar spray in green gram**
V. Thandapani

R.1. Pl. Physiol. 224 **Efficiency of foliar fertilization in red gram**
V. Thandapani

R.1. Pl. Physiol. 225 **Efficiency of foliar ferrilization in black gram**
G. Velu

R.1. Pl. Physiol. 226	**Physiological and bio-chemical basis of drought tolerance in cotton** *M. Thangaraj*
R.1. Pl. Physiol. 227	Effect of deflowering in cotton *M. Thangaraj*
R.1. Pl. Physiol. 229	Nutrient spray for pod development *S. Gopalakrishnan*
R.1. Pl. Physiol. 230	Pod development in intact groundnut of harvested haulms *Kamala Thirumalaiswamy*
R.1. Pl. Physiol. 231	Comparative studies on distal and proximal kernels in groundnut *Kamala Thirumalaiswamy*
R.1. Pl. Physiol. 232	Standardization of techniques for foliar diagnosis *Y. Usha Rani*
R.1. Pl. Physiol. 233	Foliar diagnosis and correction of nutritional disorders in Jasmine and Crossandra *M. Moosa Sheriff*
R.1. Pl. Physiol. 234	Foliar diagnosis and service for the nutritional and physiological disorders in important crops of the state *M. Moosa Sheriff*
R.1. Pl. Physiol. 235	Plant water deficit and ralated physiological processes in groundnut *K. P. Vijayan*
R.1. Pl. Physiol. 236	Studies on responsiveness of groundnut with reference to thermo and photo sensitivity *K. P. Vijayan*
R.1. Pl. Physiol. 237	Productive efficiency in semi-spreading types of groundnut *Vincdini Vasudevan*
R.1. Pl. Physiol. 238	Phyiology of induced perenniality in groundnut for seed multiplication *Vinodini Vasudevan*
R.1. Pl. Physiol. 239	Root pruning in rice

POMOLOGY

R. 1. Hort. Pomol. 215	Nutrient studies in Banana *C. M Bakthavatsalu*
R. 1. Hort. Pomol. 201	Breeding investigations in Banana *S Sathiamoorthy*
R. 1. Hort. Pomol. 202	Introduction, selection and breeeing new papaya *S Sathiamoorthy*
R. 1. Hort. Pomol. 203	Nutritional studies in papaya *R. Ramadass*
R. 1. Hort. Pomol. 204	Water requirement studies in papaya *S Balasubramaniam*
R. 1. Hort. Pomol. 205	Pruning investigations in mango *V. N. Madhava Rao*
R. 1. Hort. Pomol. 206	Varietal studies in grapes *P. Selvaraj*
R. 1. Hort. Pomol. 207	Investigations to evolve rapid method of vegetative propagation of fruit plants *M Kulasekaran*
R. 1. Hort. Pomol. 208	Control of weeds in banana with the aid of herbicides *R Ramadass*
R. 1. Hort. Pomol. 209	Spacing trial in grapes *P Selvaraj*
R. 1. Hort. Pomol. 210	Physiological assessment of yield and quality parameters in grapes in relation to nutritional status *L. Veeranna*
R. 1. Hort. Pomol. 211	Improvement of pomegranate *M Kulasekaran*
R. 1. Hort. Pomol. 212	Studies on nematode parasites of banana *G. Rajendran*
R. 1. Hort, Pomol. 213	Studies on nematode parasites of grapevine *G. Rajendran*

R. 1. Hort. Pomol. 214 Studies on nematode parasites of papaya
G. Rajendaan

R. 1. Hort. Pomol. 215 Studies on banana diseases
M. Md. Usman

R. 1. Hort. Pomol. 216 Studies on diseases of grapevine and papaya
C. Prambaramani

OLERICULTURE

R. 1. Hort. Oleri. 201 Improvement of Tomato
C. R. Muthukrishnan

R. 1. Hort. Oleri. 202 Improvement of brinjal through selection and breeding
K. G. Shanmugavelu

R. 1. Hort. Oleri. 203 Improvement of tapioca
M. Vijayakumar

R. 1. Hort. Oleri. 204 Nutritional and cultural requirement of tuber crops-tapioca
N. Ramaswamy

R. 1. Hort. Oleri. 205 Improvement of chillies
P. Rangaswamy

R. 1. Hort. Oleri. 206 Improvement of bhendi through selection and breeding
R. Subbiah

R. 1. Hort. Oleri. 207 Improvement of Amaranthus
M. Khader Mohideen

R. 1. Hort. Oleri. 208 Improvement of gourds
V. Palaniswamy

R. 1. Hort. Oleri. 209 Improvement of sweet potato
N. Ramaswamy

R. 1. Hort. Oleri. 210 Improvement of radish in Tamil Nadu
O. Anchanam Alagiya Pillai

R. 1. Hort. Oleri. 211 Co-ordinated varietal testing of vegetable crops
P. Rangaswamy

R. 1. Hort. Oleri. 212 Improvement of onion
K. P. Palanisamy

R. 1. Hort. Oleri. 213	**Varietal evaluation and development of suitable varieties of cabbage** *O. Anchanam Alagia Pillai*
R. 1. Hort. Oleri. 214	**Varietal evaluation and development of suitable varieties of cauliflower for the plains** *O. Anchanam Alagia Pillai*
R. 1. Hort. Oleri. 215	**Varietal evaluation and development of suitable varieties of garden peas** *S. Thamburaj*
R. 1. Hort. Oleri. 216	**Varietal evalution and development of siutable varieties of carrot for the Plains** *O. Anchanam Alagia Pillai*
R. 1. Hort. Oleri. 217	**Varietal evaluation and development of suitable varieties of beans** *S. Thamburaj*
R. 1. Hort. Oleri. 218	Weed control in Vegetable crops *V. Asok Metha*
R. 1. Hort. Oleri. 219	Improvement of melons and cucumber *V. Palanisamy*
R. 1. Hort. Oleri. 223	Improvement of bellari onion *K. P. Palanisamy*
R. 1. Hort. Oleri. 224	Standardisation of agro techniques and storage methods for onion *K. P. Palanisamy*
R. 1. Hort. Oleri. 236	Physiological studies in capsicum *V. Asok Metha*
R. 1. Hort. Oleri. 225	**Studies on the effect of growth regulators to increase fruitset in brinjal, chilli and tomato** *V. Asok Matha*
R. 1. Hort. Oleri. 235	Improvement of capsicum *R. Subbiah*
R. 1. Hort. Oleri.	**Breeding for multiple resistance to pests and diseases in bendi** *R. Subbiah*

R. 1. Hort. Oleri. 204 Natural and cultural requirement of sweet potato
N. Ramaswamy

R. 1. Hort. Oleri. 228 Nutritional and cultural requirement of coleus
N Ramaswamy

R. 1. Hort. Oleri. 229 Nutritional and cultural requirement of colocasia
N. Ramaswamy

SPICES AND PLANTATION CROPS

R.1. Hort. Sp. & *Pl. Cr.* 201 Germplasm collection, maintenance and evaluation of turmeric
H. Ahmed Shah

R.1. Hort. Sp. & *Pl. Cr.* 202 Collection of germplasm, evaluation and maintanance of coriander
S. Syed

R.1. Hort. Sp. & *Pl. Cr.* 203 Collection of germplasm, evaluation and maintanance of fenugreek
S. Syed

R.1. Hort. Sp. & Pl. Cr. 204 Varietal studies in arecanut
T. Thangaraj

R.1. Hort. Sp. & *Pl. Cr.* 205 NPK fertilizer experiment on major soil types in different agro-climatic regions on ordinary Tall variety of coconut
V. Ponnuswami

R.1. Hort. Sp. & Pl. Cr. 206 Improvement of minor spices
R. Balakrishnan

R.1. Hort. Sp. & Pl. Cr. 207 Standardisation of agro-techniques for turmeric
H. Ahmed Shah

R.1. Hort. Sp. & *Pl. Cr.* 208 Introduction, evaluation and selection of suitable varieties of chicory
C. M. Pappiah

R.1. Hort. Sp. & Pl.Cr. 209 Standardisation of agro techniques for chicory
C. M. Pappiah

R.1. Hort. Sp. & *Pl. Cr.* 210 Seed production studies in chicory
C. M. Pappiah

R.1. Hort. Sp. & Pl. Cr. 211	Collection and evaluation of oilpalm *S. Muthuswami*
R.1. Hort. Sp. & Pl. Cr. 212	Mutation breeding in fenugreek *S. Sayad*
R.1. Hort. Sp. & Pl. Cr. 213	Trial to determine the optimum dose of NPK fertilizer for coriander *S. Muthuswami*
R.1. Hort. Sp. & Pl. Cr. 214	Studies on rapid multiplication in turmeric *R. Balakrishnan*
R.1. Hort. Sp. & Pl Cr. 215	Studies on 'no' tillage in turmeric *R. Balakrishnan*
R.1. Hort. Sp. & Pl. Cr. 216	Studies on the influeuce of different levels of potassium on yield and quality in turmeric *H. Ahmed Shah*
R.1. Hort. Sp. & Pl. Cr. 217	Mutation breeding in coriander for irrigated and rainfed crops *S. Muthuswami*
R.1. Hort. Sp. & Pl. Cr. 218	Time for sowing in coriander for irrigated and rainfed crops *V. Ponnuswami*
R.1. Hort. Sp. & Pl. Cr. 219	Deterination of suitable multi-storeyed cropping in coconut for Tamil Nadu *V. Ponnuswami*
R.1. Hort. Sp. & Pl. Cr. 220	Studies on the effect of growth retardants in arecanut *T. Thangaraj*
R.1. Hort. Sp. & Pl. Cr. 222	Determination of suitable multi-storyed cropping in arecanut for Tamil Nadu *T. Thangaraj*

FLORICULTURE

R.1. Hort. Flori. 201	Breeding and selection for improvement of flower quality, yield and essential oil content in Jasmine *P. Veluswamy*
R.1. Hort. Flori. 202	Studies on water requirement of *J. grandiflorum. L.* *S. Sambandamurthy*
R.1. Hort.-Flori. 203	Selection and breeding for improvement of quality, yield of Edward rose *. P Veluswamy*

R.1. Hort. Flori. 204 Selection and breeding for improvement of Crossandra and Barleria
P. Veluswamy

R.1. Hort. Flori. 205 Evaluation of different species and varieties of Jasmine for essential oil
K. Appavu

R.1. Hort. Flori. 207 Improvement of Agrotechniques for Chrysanthemum
R. Jayapal

R.1. Hort. Flori. 208 Improvement of Agrotechniques for Crossandra
K. Appavu

R.1. Hort. Flori. 211 Improvement of Maruvu
K. Appavu

R.1. Hort. Flori. 212 Improvement of Dhavanam
K. Appavu

R.1. Hort. Flori. 214 Collection and testing of Bougainvillea cultivars
Peter C. B. Vedamuthu

R.1. Hort. Flori. 215 Study of Hibiscus hybrids and cultivars
S. Sambandamurthy

R.1. Hort. Flori. 220 Study of performance of grafted plants versus layers in Jathimalli
S. Sambandamurthy

R.1. Hort. Flori. 2[illegible]5 Improvement of Orchids
Peter C. B. Vedamuthu

FOOD TECHNOLOGY

R.1. Food Tech. 201 Utilisation of Horticultural products from Horticultural crops (completed on 1-4-80)
R. Sadasivam

R.1. Food Tech. 212 Improving the shelf life of important commercial vegetables
Annavi Susheela Thirumaran

R.1. Food Tech. 213 Processing studies on fresh water fish
S. Neelakantan

R.1. Food Tech. 214 — Studies on the development of ready to use foods from rice
Annavi Susheela Thirumaran

R.1. Food Tech. 215 — Studies on the characteristics of rice varieties suitable for conventional products like aval and pori
Annavi Susheela Thirumaran

R.1. Food Tech. 216 — Studies on the use of legume flours in vermicelli
C. Manimekalai

R.1. Food Tech. 217 — Studies on the preparation, preservation and use of sweet potato flour in foods
C. Manimegalai

FORESTRY

R. 1. Forest. 201 — Agronomic studies on nursery stock of local bamboos-II. *Dendro calamus strictus.*
J. William

R. 1. Forest. 202 — Agronomic studies in nursery stock of local bamboos-II. *Bamboosa bambus*
P. Seshadri

R. 1. Forest. 203 — Studies on production techniques of Bamboo Rhizome propagules (*D. Strictus* and *B. bambos*)
P. Seshadri

R. 1. Forest. 209 — Evolution of high yielding strains in Eucalyptus by breeding
M. Rathinam and C. Surendran

R. 1. Forest. 210 — Genetic studies on the economic traits of (paper) pulp wood in Eucalyptus
M. Rathinam, C. Surendran and K. A. Chellapillai

R. . 1Forest. 211 — Isolation of desirable candidate trees for coppice potential and response to fertiliser in Eucalyptus
J. Wilson

R. 1. Forest. 212 — Studies on Vegetative propagation methods in tree species
J. Wilson

ECONOMICS

R. 1. Ag. Econ. 202 — Comprehensive scheme for studying the cost of cultivation of principal crops in Tamil Nadu
P. K. Aiyasamy

R. 1. Ag. Econ. 223 Inter Regional Movement of Rice in Tamil Nadu
P. K. Aiyasamy

R. 1. Ag. Econ. 249 *Price Behaviour of Major Agricultural Commodities* in Tamil Nadu
S. Krishnamoorthy

R. 1. Ag. Econ. 257 Operational research for grass root level planning - A model for Nallampalli Block-Dharmapuri District
S. Varadarajan

R. 1. Ag. Econ. 258 A study on Pisciculture in Farms in Thanjavur District
S. Varadarajan and *R. Umakesan*

R. 1. Ag. Econ. 259 Supply price relationship of rice in Tamil Nadu - A micro-macro Appraisal
C. Ramasamy

R. 1. Ag. Econ. 260 A systems approach for cconomic appraisal of agricultural development in Polur, North Arcot District,
V. Meenakhisundaram

R. 1. Ag. Econ. 261 Demand for Fertilizer at Farm level in Tamil Nadu
P. Zeaudeen

R. 1. Ag. Econ. 262 Role of credit in agriculture as among different crops and *farm situations*
R. Srinivasan

R. 1. Ag. Econ. 263 Efficiency in use of farm credit
S. Varadarajan

R. 1. Ag. Econ. 264 A study of Determinants of size of family
S. Varadarajan

R. 1. Ag. Econ. 265 Efficiency of milk co-operatives
L. P. Swaminathan

R. 1. Ag. Econ. 266 *A study on variation in rainfall and its impact on farm* income in a drought prone area of Tamil Nadu
R. Sundaresan

R. .1 Ag. Econ. 267 Determinants of fertilizer use at farm level
S. Rajamani

R. 1. Ag. Econ. 268 Export and domestic trade of turmeric in Tamil Nadu
N. Raveendran

R. 1. Ag. Econ. 269 Profitability of broiler production in the environs of Coimbatore city
S. Devarajan

R. 1. Ag. Econ. 270 Deteminants of standard of living in selected regions of Tamil Nadu
S. Varadarajan and *S. Rajamani*

R. 1. Ag. Econ. 271 An economic appraisal of major surface irrigation projects io Tamil Nadu - A case for Parambikulam Aliyar Project
K. Palanisami

R. 1. Ag. Econ. 272 Changes in labour use, wage rate and labour productivity in cotton crop over time as among regions and farm sizes in Tamil Nadu

R. 1. Ag. Econ. 273 Consumption behaviour of farm households in Nilgiris District
T. K Shanmugasundaram

R. 1 Ag. Eccn. 274 Marketing of onion in Tamil Nadu
K. Rajendran

R. 1. Ag. Eccn. 275 Constraint research in potato in Nilgiris district
V. Puhazhendhi

R. 1. Ag. Econ. 276 Levels of living and wages of farm labourers in Nilgiris district
V. Puhazhendhi

R. .1 Ag. Econ. 277 Returns to investment in research and extension.-A study on Indo-German Nilgiris Development Project
C. Ramasamy

R. 1. Ag. Econ. 278 Problems in production and marketing of major vegetables in Coimbatore district
C. Ramasamy

R. 1. Ag. Econ. 279 A study on marketable surplus of paddy in Thanjavur district
S. Kombairaju

R. 1. Ag. Econ. 280 Impact of energy use on production, productivity and income of the selected farms
T. K. Shanmugasundaram

R. 1. Ag. Econ. 281 Variations in cost of production of rice in Tamil Nadu. 1971 - 72 to 1977 - 78
V. Balakrishnan

R. 1. Ag. Econ. 282 Spatial and temporal distribution of wages in Tamil Nadu
B. Natarajan

R. 1. Ag. Proc. 247 **Design and development of a machine for dehusking arecanut**
M. Balasubramanian

R. 1. Ag. Proc. 248 **Development of a machine for extracting fibre from agave**
M Balasubramanian

R. 1. Ag. Proc. 249 Utilization of Agrl. waste material for cattle feed
V. Murugesan

R. 1. Ag. Proc 250 Processing techniques in dhal making of pigeon pea
B. Heeralal

R. 1. Ag. Proc. 251 Determination of angle of repose for grain at different moisture levels
P. K. Selvaraj

R. 1. Ag. Proc. 252 Study of bulk density of cereal crops at different moisture levels
K. G. Muniraj

R. 1. Ag. Proc. 253 Design and development of a dehulling cum milling machine for grains
R. Arjunan Muthiah

R. 1. Ag. Proc. 254 Optimisation of sieve sizes for cereals and oil seeds
R. Arjunan Muthiah

R. 1. Ag. Proc. 255 Design and development of a manually operated cleaner
D. Tamil Mani

R. 1. Ag. Proc. 256 Characterisation of leaf protein concentrate
K. Parvathi

Post Harvest Technology Scheme

R. 1. Ag. Proc. 214 **Optimum stage of harvest for rice, groundnut, sorghum and redgram**
K. V. Selvaraj

R. 1. Ag. Proc. 217 **Effect of processing by mechanical equipments, under varios agronomic practices for rice, groundnut, sorghum and pulses**
B. Heeralal

R. 1. Ag. Proc. 220 **Studies on drying methods for rice, groundnut, sorghum and pulses**
G. Doraiswamy

R. 1. Ag. Proc. 226 Effect of different methods of processing on storage pests of paddy, sorghum, groundnut and pulses
S. Letchoumanane

R. 1. Ag. Proc. 227 Evaluation of storage structures for paddy, groundnut, sorghum and redgram
S. Letchoumanane

R. 1. Ag. Proc. 228 Studies on the use of plant products and inter materials for the control of store pests of paddy, groundnut, sorgum and redgram
S. Letchoumanane

R. 1. Ag. Proc. 229 Chemical control of store pests of paddy, groundnut, sorhum and redgram
S. Letchoumanane

R. 1. Ag. Proc. 231 Biochemical studies of paddy, sorghum, groundnut and pulses during seed maturation
K. Parvathy

R. 1. Ag. Proc. 232 Biochemical changes of paddy, groundnut, sorghum and pulses in storage
K. Parvathy

R. 1. Ag. Proc. 243 Studies on the effect of fertilizer and hormones on the post harvest quality of redgram
K. V. Selvaraj

R. 1. Ag. Proc. 244 Studies on the effect of fertilizer and chemicals on post harvest quality of sorghum
K. V. Selvaraj

I. D. R. C. Scheme

ORICOI78/1 Field evaluation of Coimbatore and Udaipur dehusker shellers
D. Tamil Mani

ORICOI78/2 Evaluation of rubber roller sheller, screw polisher and huller as polisher for paddy milling
M. Ramanathan

ORICOI78/3 Field evaluation of TNAU winnowers as compared with other cleaners
D. Tamil Mani

OR/CO/7814 Evaluation of improved indigenous storage structures for sorghum and greengrams
M. Ramanathan

OR/CO/7815 Evaluation and devolopment of Coimbatore solar drier for paddy, sorghum, bajra and chillies
M. Ramanathan

SOIL AND WATER CONSERVATION ENGINEERING

R. 1. SWC. 230 Evaluation of an irrigation system and formation of an operational manual - A case of the Lower Bhavani Project, Coimbatore district
G. Balasubramanian

R. 1. SWC. 231 Investigation of effect of subsurface drainage on crop production under poor quality (saline) irrigation water on Black soils
K. Arumugam

R. 1. SWC. 232 Investigation of relationship between depth of ploughing for puddling for paddy and percolation loss, with different soils
K. Arumugam

R. 1. SWC. 233 Consumptive use determination of sorghum, black gram and vegetables by Neutron probe
S. Senthilvel

R. 1. SWC. 234 Investigation of effective rainfall pattern on red and black soils in TNAU campus
S. Senthilvel

R. 1. SWC. 235 Effect of vegetation on infiltration rate
S. M. Murugesan

R. 1. SWC. 236 Studies on water saving methods of irrigation for vegetable and fodder crops at Vivekanandapuram
O. Padmakumari

R. 1. SWC. 237 Pilot Project for land and water use in Lower Bhavani river basin
G. Balasubramanian

R. 1. SWC. 238 Land and water use planning of water sheds-PL480 Scheme
M. Koteeswaran

R. 1. SWC. 239 Soil conservation measures for Dryland based on soil loss equation - PL 480 Scheme
O. Padmakumari

R. 1. SWC. 240 Methods of construction of open and tube wells and deepening the existing open wells under quick sand conditions to increase the yields - ICAR Scheme
V. Kumar

R. 1. SWC. 241 Hydraulics of check basin irrigation
K. R. Karai Gowder

R. 1. SWC. 242 Study of furrow irrigation system for sorghum crop
S. Kumaravel

R. 1. SWC. 243 Water optimisation studies in drip irrigation
O. Padmakumari

AGRICULTURAL STRUCTURES

R. 1. Ag. St. 205 Design and development of distribution stand for low pressure pipe line irrigation system
K. R. Karai Gowder

R. 1. Ag. St. 206 Design and development of cheap outlet structures for low pressure pipe line irrigation system
K. R. Karai Gowder

R. 1. Ag. St. 208 Design and development of economical cages for rearing of poultry
B. Samaraj

R. 1. Ag. St. 209 Design and development of composite roofing
M. V Rangaswami

R. 1. Ag. St. 210 Design and development of float valve for distribution tank of underground pipeline irrigation system
M. Mohan

R. 1. Ag. St. 211 Analysing the component cost of different structures
M. Vaikundamoorthy

AGRICULTURAL BOTANY

R. 2. Ag. Bot. 101 Improvement of onion by induced mutagenesis, selection and hybridisation
V. D. Guruswamy Raja

R. 2. Ag. Bot. 105 Collection and study of morphology and cytology of different varieties, species and their hybrids in 'Capsicum'
S. Rajasekaran

R. 2. Ag. Bot. 201 Evolving of high yielding early variety of rice maturing in less than 100 days and possessing a high degree of resistance to pests and diseases
V. D. Guruswamy Raja

R. 2. Ag. Bot. 202 Evolving of high yielding and pest and disease resistant rice of 100 - 120 days duration
S. Sivasubramaniam and *M. Subramaniam*

R. 2. Ag. Bot. 203 Evolution of high yielding indehiscent white seeded gingelly strain with high oil content and drought tolerance
S. M. Ibrahim

R. 2. Ag. Bot. 204 Studies on the improvement of bhendi suited to Madurai area through selection and breeding
N. Jayaraman

R. 2. Ag. Bot. 205 Evolving superior mutant of Capsicum through induced mutagenesis
S. Rajasekaran

R. 2. Ag. Bot. 207 Varietal improvement in groundnut (*Arachis hypogaea*) - Evolution of Superior strains by induced mutagenesis
V. D. Guruswamy Raja and *S. M. Ibrahim*

R. 2. Ag. Bot. 209 Evolving of high yielding short duration castor suitable for southern districts of Tamil Nadu
N. Jayaram and *S. M. Ibrahim*

R. 2. Ag. Bot. 210 Evolving of improved strains of rice of 120 - 140 days duration combining high yield potential and resistance to major pests and diseases
K. S. Paramasivam and *M. Subramaniam*

R. 2. Ag. Bot. 213 Evolving of high yielding strain of rice of 140 - 60 days duration combining high yield potential and resistance to major pests and diseases
K. S. Paramasivam, M. Subramaniam and *K. Nagarajan*

R. 2. Ag. Bot. 214 Improvement of long duration varieties of rice (160 days and above) for high yield and resistance to pests and diseases
S. Sivasubramaniam and *K. Nagarajan*

R. 2. *Ag. Bot.* 221 Studies on the prevention of flower drop in red gram
Vinodhini Vasudevan and *M. Nagarajan*

R. 2. *Ag. Bot.* 222 Studies on photosynthetic efficiency in green gram, red gram and black gram, with special reference to pods
Vinodhini Vasudevan and *M. Nagarajan*

R. 2. *Ag. Bot.* 223 Studies on drought tolerance in black gram, green gram and red gram
Vinodhini Vasudevan and *M. Nagarajan*

R. 2. *Ag. Bot.* 224 Development of high yielding varieties of sorghum suitable for rainfed area
S. Rajasekaran

R. 2. *Ag. Bot.* 230 Evolution of hybrid or hybrid derivative cotton with shorter duration, high yield and quality
N. Jayaraman

AGRONOMY

R. 2. *Agron.* 211 Fixing high yielding paddy strains for double cropping in Periyar tract
V. Thirumurugan

R. 2. *Agron.* 214 Survey of existing socio-economic conditions, cultural practices and working out economics of cultivation
S. Purushothaman

R. 2. *Agron.* 219 Mixed cropping in irrigated cotton
S.Kolandaisamy

R. 2. *Agron.* 221 Inter cropping in banana
K. K. Subbiah

R. 2. *Agron.* 226 Irrigation requirement of rice fallow crop
S. Purushothaman

R. 2. *Agron.* 227 Effect of various irrigation schedules on kharif crops : Tomato CO 2
V. Subbiah

R. 2. *Agron.* 228 Determination of critical moisture stress at different growth stages of crops following climatological approach
B. Gururajan

R. 2. *Agron.* 229 Effect of moisture stress on khariff crops
B. Gururajan

R. 2. Agron 230 Efficiency of mulches in reduction of irrigation requirements of crops
V. Subbiah

R. 2. Agron. 231 Evolving agronomic practices for new cultural practices in dryland sorghum
V. Veerabhadran

R. 2. Agron. 232 Agronomic practices for Bhendi
K. P. Ramaswamy

R. 2. Agron. 233. Evolving improved cultural practices for dryland sorghum
V. Veerabhadran

R. 2. Agron. 234 Response of rainfed paddy variety culture 2 for population densities and levels of N
P. Muthukrishnan

R. 2. Agron. 235 Minimal tillage and finding suitable variety and cultural practices for paddy
K K. Subbiah

SOIL SCIENCE AND AGRICULTURAL CHEMISTRY

R. 2. SS & AC. 206 Methods of reclamation of salinity and alkalinity in different types of soil.
P. Kandaswamy

R 2. SS & AC. 210 Studies on soil water movement under different irrigation regimes.
K. Mayalagu

R. 2. SS & AC. 211 Permanent manurial experiment on rice.
S. Mani

R. 2. SS & AC. 212 Studies on the quality of irrigation waters of southern districts of Tamil Nadu
P. Kandaswamy

R. 2. SS & AC. 215 Residual effect of water soluble and non-water soluble phosphate fertilizers on acid, neutral and alkaline soils and their influence to cereal and pluse crop.
M. Peer Mohammed

R. 2. SS & AC. 216 Influence of sulphur fertilization on the yield of maize and paddy and their quality
C. S. Balasundaram

R. 2. SS & AC. 218 Siol test crop response correlation studies on rice.
C. S. Balasundaram

R. 2. SS & AC. 220 Studies on the fertilizer response in direct sown rice under semi dry conditions.
C. S. Balasundaram

R. 2. SS & AC. 221 Effect of seed treatment with different salt and hormone solution on the growth and yield of major millets.
C. Paulraj

R. 2. SS & AC. 222 Studies on the use of coal ash in improving the physico-chemical properties of soils.
S. Mani

R. 2. SS & AC. 223 Studies on the interaction of micronutrients on paddy soils
S. Subramaniam

R. 2. SS & AC. 224 Effect of coconut coir wastes from the coir industries on the improvement of Physico - chemical properties of soils.
S. Subramaniam

R. 2. SS & AC. 227 Studies on the effect of Azolla incorporation on soil properties and its influence on the fertility of soils of Southern districts of Tamil Nadu.
G. Arunachalam

R. 2. SS & AC. 233 Studies on the uptake of major nutrients under different irrigation regimes.
M. Peer Mohammed

PLANT PATHOLOGY

R. 2. Pl. Path. 209 Studies to evolve effective field control of rhizome and pod rot of cardamom.
M. N. Alagianagalingam

R. 2. Pl. Path. 212 Studies on groundnut rust
S. Natarajan

R. 2. Pl. Path. 210 Investigation of chilli mosaic and control of powdery mildew disease of chilli.

ENTOMOLOGY

R. 2. Ag. Ent. 201 Chemical control of rice pest
S. Uthamasamy

R. 2. Ag. Ent. 202 Studies on the varietal resistance to stem borer, leaf roller and gallfly in paddy
L. Krishnadoss

R. 2. Ag. Ent. 203 Infestation control of storage pests
T. Kumarasamy

R. 2. Ag. Ent. 206 Studies on the varietal resistance of bhendi and brinjal to the red spider mite
T. Kumarasamy

R. 2. Ag. Ent. 208 Biological control of paddy pests
S. Jayaraj

R. 2. Ag. Ent. 213 Integrated control of rice brown planthopper
S. Uthamasamy

R. 2. Ag. Ent. 214 Integrated control of *Spodoptera litura* on cotton
B. Rajendran

R. 2. Ag. Ent. 216 Studies on antifeedants in the control of insects
M. Muthuraman

R. 2. Ag. Ent. 218 Chemical control of groundnut pests
R. Balagurunathan

R. 2. Ag. Ent. 219 Use of NPV in the control of groundnut red hairy caterpillar and its safety to non-target organisms
R. Balagurunathan

R. 2. Ag. Ent. 220 Studies on the ecology of sugarcane borers and time of release of their parasites
D. Krishnadoss

R. 2. Ag. Ent. 221 Use of white halo fungus in controlling the coffee green bug and its safety to beneficial insects and vertebrates
K. Soundararajan

R. 2. Ag. Ent. 222 Ecology of spiders in relation to pest control
S. Thirumurthi

R. 2. Ag. Ent. 223 Effect of insecticides on the rice ecosystem
S. Thirumurthi

R. 2. Ag. Ent. 224 Studies on the integrated control of pests of chillies
N. Dhandapani

HORTICULTURE,

R.2. Hort. 209 Improvement of dryland brinjal through breeding
K. M. P. Nambisan

R.2. Hort. 210 Effect of graded dose of potash on the performance of Guava
D. Paulas

R.2. Hort 211 Studies on the effect of graded doses of nitrogen to wet-land bananas, namely 'Poovan', Vayal vazhai' and 'Monthan'
D. Paulas

R.2. Hort. 212 Breeding superior varieties of Jasmine
B. M. Krishnan

R.2. Hort. 213 Effect of graded dose of Nitrogen and two levels of pruning on Edward Rose
K. P. M. Nambisan

R. 2. Biol. 205 Studies on seed setting and germinating vegetable seeds
Girija Balasubramanyam

R. 2. Biol. 214 Interaction between plant protection chemicals and legume Rhizobia symbiosis
M. Rangarajan

AGRICULTURAL ENGINEERING

R. 2. Engg. 201 Evaluation of irrigation methods for different Horticultural crops
S. Sankaralingam

R. 2. Engg. 203 Moisture conservation methods for dry farming
S. Sankaralingam

R. 2 Engg. 207 Studies on different devices of grain storage for small farmers
M. Singaravelu

R. 2. Engg. 209 To study the methods to prevent percolation losses
M. V. Rengasamy & V J. F. Kumar

R. 2. Engg. 210 Design and Development of manually operated centrifugal sprayers
M. Singaravelu

R. 2. Engg. 211 Design and Development of a fish Descaling unit
S. Srinivasan

R. 2. Engg. 212 To study and develop the design criteria of furrow irrigation method for efficient use of water
M. V. Rengasamy & V. J. F. Kumar

R. 2. Engg. 213 To study different irrigation efficiencies on sprinkler irrigation
M. V. Rengasamy

R. 2. Engg. 214 Design and Development of equipment for spot application of fertilizers and pesticides
L. Gothandapani

R. 2. Engg. 215 Effect of drift of Agro chemicals used in different spraying systems
L. Gothandapani

A. R. S. BHAVANISAGAR

R. 3. Agron 211 To evolve multiple cropping pattern for gardenland under Bhavanisagar
M. Krishnasamy

R. 3. Agron. 213 Intercropping in Turmeric
M. Krishnasamy

R. 3. Agron. 215 Production potential experiment
S Ramachandran

R. 3. Agron. 216 Production potential under resource constraints
M Krishnasamy

R. 3. Agron. 217 Intensive Farming system for small holders
M. Krishnasamy

R. 3. Agron. 218 Manurial requirement of a fixed crop rotation
M. Krishnasamy

R. 3. Agron. 220 Agronomic evaluation of new promising pre-release varieties / hybrids of Jowar
S. Ramachandran

R. 3. Agron. 222 Nitrogen economy through organic manures
S. Ramachandran

R. 3. Agron. 225 Studies on effect of various irrigation schedules and fertilizer levels on growth and yield of cotton
P. Sennaiyan

R. 3. Agron. 226 Studies on effect of various irrigation schedules and fertilizer levels on growth and yield of ragi and bajra (Climatological approach)
P. Sennaiyan

R. 3. Agron. 228 **Studies on time of harvest and germination of sunflower**
K. Narayanan

R. 3. Agron. 229 **Long range effect of continuous cropping and manuring**
S. Ramachandran

R. 3. Agron. 234 **Operational Research in improved Water Management Practices on cultivator's field**
P. Sennaiyan

R. 3. Agron. 235 **Studies on effect of various irrigation schedules and fertilizer level on growth and yield of groundnut and sunflower (Climatological approach)**
P. Sennaiyan

R. 3. Agron. 236 **Studies on water use of crops-grown in pure and mixed stands (Climatological appoach)**
M. P. Vasimalai

R. 3. Agron. 237 **Effect of growth Regulators on pulses**
P. Subbian

R. 3. Agron. 238 **Studies on effect of various irrigation schedules and fertilizer level on growth and yield of pulses - black gram and green gram (Climatological approach)**
M. P. Vasimalai

R 3. Agron 239 **Testing tobacco varieties for their suitability to LBP area**
A. V. Rajan

R. 3. Agron. 240 **Studies on sugarcane varieties**
K. Narayanan

R. 3. Agron. 241 **Fertility cum irrigation studies on sunflower**
K. Narayanan

R. 3. Agron. 242 **Water requirement of turmeric**
R. Kaliappa

AGRICULTURAL BGTANY, BHAVANISAGAR

R. 3. Ag. Bot. 201 **Evaluation of high yielding, pest and disease resistant strains of rice of 100 - 120 days**
P Sundaramoorthy

R. 3. Ag. Bot. 202	Evaluation of improved strains of rice of 120 - 140 days duration combining high yield and resistance to major pests and diseases *M. N. Ramaswamy*
R. 3. Ag. Bot. 203	Testing promising cultures of cotton, sorghum and milletts and pulse crops *V. P. A. Rajasekaran*
R. 3. Ag. Bot 208	Varietal renovation for the production of super elite sunflower seeds *N. M. Ramaswamy*
R. 3. Ag. Bot. 209	Selection criteria, correlation and path analysis studies on yield and its attributes in sunflower *N. M. Ramaswamy*
R. 3. Ag. Bot. 210	Testing promising cultures of fibre crops viz , cotton, jute and mesta for Lower Bhavani Project area *K. Mohanasundaram*

SOIL SCIENCE AND AGRL. CHEMISTRY, BHAVANISAGAR

R. 3. SS & AC. 202	Effect of phosphorus and potassium on oil content and quality of sunflower *T. L. Subramanian*
R. 3. SS & AC. 203	Effect of plant population and N levels on the oil content of sunflower *P. Muthuvel*
R. 3. SS & AC. 204	Quantity and quality of oil in sunflower as influenced by tha climatic factors *T. L. Subramanian*
R. 3. SS & AC. 205	Studies on the keeping quality of sunflower oil *P. Muthuvel*
R. 3. SS & AC. 206	Nutrient removal by sunflower and its effect on the succeeding crop *P. Muthuvel*
R. 3. SS & AC. 207	Phosphorus - zinc interaction in sunflower *T. L. Subramanian*
R. 3. SS & AC. 208	Studies on the effect of different mulches on water retention and nutrient availability *N. M. Thyagarajan*

R. 3. SS & AC. 209 Studies on crusting of soil and methods of preventing crusting
K. Shanmugam

R. 3. SS & AC. 210 Studies on sub-soil compaction to find out the threshold of bulk densities for different crops in LBP area
K. Shanmugam

R. 3. SS & AC. 211 Effect of different levels of irrigation on the movement and availability of zinc
K. Mani

R. 3. SS & AC. 212 Studies on soil water movement under different irrigation regimes
K. Mani

R. 3. SS & AC. 213 Effect of different levels of irrigation and phosphorus on the availability of nutrients, root distribution and yield of sorghum, lab-lab and tomato
K. Shanmugam

R. 3. SS & AC. 214 Effect of Mg & S on the uptake of nutrients, quality and yield of oil in sunflower
T. L. Subramaniam

R. 3. SS & AC. 215 Evaluation of moisture retention and release characteristics of different soil types in LBP command area
N. M. Thyagarajan

SEED TECHNOLOGY, BHAVANISAGAR

R. 3. Seed Tech. 201 Effect of seed test variability on the growth and yield of sunflower
A. V. Rajan

R. 3. Seed Tech. 202 Seed viability and methods of storage of sunflower seeds
T. V. Karivaratharaju

R. 3. Seed Tech. 203 Standardisation of post-harvest technology of sunflower
T. V. Karivaratharaju

R. 3. Seed Tech. 204 Studies on standardisation of seed production and seed storage techniques in tomato
T. V. Karivaratharaju

R. 3. Seed Tech. 205 Studies on seed production technology and storage techniques in radish
T. V. Karivaratharaju

R. 3. Seed Tech. 206 Standardising quality seed production and seed storage techniques in cucurbitaceous vegetables like ashgourd, bottle gourd, ribbed gourd, bitter gourd, snake gourd, pumpkin, cucumber and melon
T. V. Karivaratharaju

R. 3. Seed Tech. 207 To determine the package of practices of seed production and storage in Amaranthus
V. Palanisamy

R. 3. Seed Tech. 208 Studies on standardisation of seed production and seed storage techniques in Bhendi
V. Palanisamy

R. 3. Sead Tech. 209 Standardisation of seed production technology and seed storage techniques in Dolichos
T. V. Karivaratharaju

R. 3. Seed Tech. 210 Evolving suitable techniques for the production and storing of seads in brinjal
T V. Karivaratharaju

R. 3. Seed Tech. 211 Evolving suitable package of practices for quality seed production and storage in chillies
T. V. Karivaratharaju

HORTICULTURE, BHAVANISAGAR

R. 3. Hort. 201 Improvement of music-melon and water melon through selection and breeding
N. Chezhiyan

R. 3. Hort. 202 Improvement of pod vegetables with special reference to french beans, lab-lab and soyabeans through selection and breeding
N. Chezhiyan

R. 3. Hort. 203 Studies on agro techniques in vegetable crops with special refefence to use of NPK nutrients
N. Chezhiyan

R. 3. Hort. 204 Studies on agro techniques in close crops with special reference to fix the suitable variety and time of planting
N. Chezhiyan

R. 3. Hort. 205 Studies on agro techniques in vegetable crops with special reference to use of micronutrients
N. Chezhiyan

R. 3. Horr. 206 Fertilizer studies in Banana
N Chezhiyan

R. 3. Hort. 207 Studies on ratooning in Banana Dwarf cavindish & Robusta
N. Chezhiyan

R. 3. Hort. 208 Improvement of turmeric through selection
N. Chezhiyan

ENGINEERING, BHAVANISAGAR

R. 3. Engg. 201 Design and evaluation of watar measuring/regulating/instruments/equipments

Evaluation of module supplied by the Karapur unit
C. Jambuliugam

FISHERY, BAVANISAGAR

R. 3. Fish. 202 Survival, production and growth of carp hatchlings
P. Gopalakrishnan

R. 3. Fish. 203 Composit fish culture
P. Gopalakrishnan

R. 3. Fish. 204 Murrel culture in farm ponds
P. Gopalakrishnan

AGRICULTURAL RESEARCH STATION, ALIYARNAGAR (INCLUDING GROUNDNUT RESEARCH STATION, POLLACHI)

R. 4. Agron. 205 Impact of various inputs in groundnut
RM. Panchanathan

R. 4. Agron. 206 Mixed cropping trial in rainfed groundnut
RM. Panchanathan & N. Arunachalam

R. 4. Agron. 207 Study on relay cropping system for garden land - assured irrigation area
N. Arunachaiam

R. 4. Agron. 208 Study on relay cropping system for PAP area
N. Arunachalam

R. 4. Agron. 209	Major constraints in crop management in groundnut and their effect on yield *RM. Panchanathan*
R. 4. Agron. 211	Study on mixed cropping in soyabean *S. Somasundaram*
R. 4. Ag. Bot. 101	Evaluation of germplasm stock of groundnut (*A.hypogea*(*R. Sethupathi Ramalingam & M. Pandiyan*
R. 4. Ag. Bot. 201	Screening of elite bunch groundnut selections for adaptability and stability performance *R. Sethupathi Ramalingam & M. Pandiyan*
R. 4. Ag. Bot. 202	Exploitation of variability 'reslised through intervarietal mating in the genetic improvement of bunch groundnut *M. Pandiyan*
R. 4. Ag. Bot. 203	Evolution of superior bunch groundnuts by exploiting induced mutagenesis *R. Sethupathi Ramalingam*
R. 4. Ag. Bot. 204	Evaluation of breeding materiels of gronndnut in off-season nursery for population build *R. Sethupathi Ramalingam*
R. 4. Ag. Bot. 205	Evaluation of promising semi-spreading groundnut varieties and selection for their performance *R. Sethupathi Ramalingam*
R. 5. Ag. Bot. 201	Evolution of bunch groundnut combining improved yield and resistance to diseases *N.' Mohamed Sheriff & V. Mylswamy*
R. 5. Ag. Bot. 202	Synthesis of high yielding semi-spreading groundnut strains superior to the existing ones *N. Mohamed Sheriff & V. Mylswamy*
R. 4. Ag. Ent. 201	Insecticidal schedule for the control of major insect pests occuring on groundnut in Pollachi Taluk *R. Ramasamy & P. Sivasubramanian*
R. 4. Ag. Ent. 204	Screening groundnut [germplasm and promising breeding materials for resistance against insect pests *P. Sivasubramanian*

R.4. Pl. Path. 201 Fungicidal schedule for the control of major diseases of groundnut occurring in Pollachi tract
R. Ramaswamy

R.4. Pl. Path. 202 Combination trial for the control of major pests and diseases on groundnut
R. Ramaswamy

R.4. Pl. Path. 203 Screening of groundnut varieties for resistance to tikka leaf spot and rust diseases
R. Ramaswamy

HORTICULTURAL RESEARCH STATION, PERIYAKULAM

R. 6. Hort. 201 Improvement of mango through selection and breeding
S. Anbu

R. 6. Hort. 206 Manurial studies in guava
R. S. Azhakiamanavalan

R. 6. Hort. 209 Introduction and study of performance of new kinds and varieties of horticultural crops
S. Anbu

R. 6. Hort. 210 Improvement of tomatoes through selection and breeding
S. Anbu

R. 6. Hort. 213 Improvement of sapota through breeding
S. Anbu

R. 6. Hort. 214 Improvement of cucurbitaceous crops through selection and breeding
S. Anbu

R. 6. Hort. 215 Improvement of brinjal through selection and breeding
S. Anbu

R. 6. Hort. 218 Improvement of planting material for acidlime
R. S. Azhakiamanavalan

R. 6. Hort. 219 Influence of growth regulants on fruit set, fruit drop and quality of acid lime and mandarin
R. S. Azhakiamanavalan

R. 6. Hort. 220 Effect of variable doses of Nitrogen on acid lime & mandarin
R. S. Azhakiamanavalan

R. 6. Hort. 221 Improvement of acid lime by selection
R. S. Azhakiamanavalan

R. 6. Pl. Path. 201 Control of virus diseases in acid lime
N. Shanmugam

R. 6 Pl. Path. 202 Control of powdery mildew in mandarin
N. Shanmugam

R. 6. Pl. Path. 203 Studies on citrus canker
C. Thalamuthu

R. 6. Pl. Path. 204 Chemical control of twig blight caused by *Celletotrichum gleosporioides*
C. Thalamuthu

R. 6. Pl. Path. 205 Studies on bud transmissible diseases of acid lime
N. Shanmugam

R. 3. Ento. 201 Control of major insect pests of acid lime and mandarin
S. Kuttalam

R. 3. Ento. 202 Control of nematodes of acid lime
P. V. Subba Rao

R. 3. Physiol. 201 Studies on secondary and micronutrient on acid lime and mandarin
G. Dharmaraj

R. 3. Physiol. 202 Studies on drought tolerance and moisture conservation in acid lime
G. Dharmaraj

R. 3. Physiol. 203 Control of weeds with herbicides in acid lime orchards
R. Chandrababu

HORTICULTURAL RESEARCH STATION, KODAIKANAL

R. 7. Hort. 207 Manurial trial in apple parlins' beauty
R. Arumugam

R. 7. Hort. 210 Studies of fruiting habit and pruning in parlins beauty
S. Natarajan

R. 7. Hort. 213 Studies on propagation of geranium
N. Kumar

R. 7. Hort. 216 Fertilizer trial on pyrethrum
N. Kumar

R. 7. Hort. 217 Fertilizer trial in fox glove (Digitalis)
V. P. A. Rajasekaran

R. 7. Hort. 218 Studies on the effect of N and P on geranium
K. Rajakkannu

R. 7. Hort. 219	Foliar nutrition studies in geranium *P. S. Srinivasan*
R. 7. Hort. 220	Studies on Mentha sp. *V. P. A. Rajasekaran & M. Dakshinamoorthy*
R. 7. Hort. 221	Evaluation of geranium *K. Rajakkannu*
R. 7. Hort. 222	Evaluation of digitalis *K. Rajakkannu*
R. 7. Hort. 223	Evaluation of aromatic and medicinal plants of Kodaikanal *K. Rajakkannu*
R. 7. Hort. 224	Varietal evaluation and development of suitable varieties of cauliflowers *S. Natarajan*
R. 7. Hort. 226	Varietal evaluation and development of suitable varieties of cabbage *R. Arumugam*
R. 7. Hort. 227	Varietal evaluation and development of suitable varieties of peas *R. Arumugam*
R. 7. Hort. 229	Evaluation and improvement of desi types of carrot *S. Natarajan*
R. 7. Hort. 232	Standardisation of seed production in carrot *R. Arumugam*
R. 7. Hort. 236	Hormonal studies in digitalis *P. S. Srinivasan*
R. 7. Hort. 238	Weed control studies in geranium *P. S. Srinivasan*
R. 7. Hort. 240	Effect of N, P and K on Mentha *M. Dakshinamurthy*
R. 7. Hort. 242	Trace element studies in geranium *M. Dakshinamurthy*
R. 7. Hort. 244	Defoliation studies in digitalis *R. Arumugam*

R. 7. Hort. 245	Breeding in pyrethrum *N. Kumar*
R. 7. Hort. 246	Selection of strawberry varieties *R. Arumugam*
R. 7. Hort. 247	Mulching trial in starwberry *N. Kumar*
R. 7. Hort. 248	Effect of graded doses of NPK on yield and quality of pear *K. Rajakkannu*
R. 7. Hort. 249	Selection of high yielding pear varieties *V. P. A. Rajasekaran*
R. 7. Hort. 252	Collection, introduction and evaluation of garlic types *N. Kumar*
R.7.Physiol. 201	Weed control studies in pyrethrum *O. S. Kandasamy*
R. 7. Hort. 205	Picking studies of apples *P. S. Srinivasan*

R. R. S. KAVERIPATTINAM

R. 8. Agron. 208	Formation of package of practices for rainfed cotton in Dharmapuri district *P. Senthamil selvan*
R. 8. Agron. 209	*Study to evolve on optimum combination of dairy/poultry* units for marginal farmers to maximise income and employment *K. N. Chinnaswami*
R. 8. Agron. 210	Working out optimum farm plans and comparative economics of mixed farming in Kaveripattinam area *Rathina Jacob Kumar*
R. 8. Agron. 211	Evolving suitable cropping patterns with different combi nation of crops and livestock for marginal farmers o Kaveripattinam area to obtain maximum income *R. Jagannathan*
R. 8. Agron. 213	Demonstration of recommended practices and appro priate technology in rice *O. S. Kandasamy*

R. 8. Agron. 214	Demonstration of recommended practices and appropriate technology practices in rainfed and irrigated groundnut and sorghum *O. S. Kandasamy*
R. 8. Agron. 215	Manurial trial on rainfed ragi to fix economical dose of N, P and K *R. Jagannathan*
R. 8. Agron 216	Formulation of dry farming techniques for obtaining maximum production and income *R. Jagannathan*
R. 8. Agron. 217	Studies on multiple and relay cropping under dry land condition *K. N. Chinnaswami*
·*R. 8. Agron.* 218	Studies on the multiple and relay cropping under wet land conditions *K. N. Chinnaswami*
R. 8. Agron. 219	Response of groundnut to phosphorus *K. N. Chinnaswami*
R. 8. Agron. 220	Effect of Gramaxone as defoliant on irrigated cotton *O. S. Kandasamy*
R. 8. Agron. 221	Skipping basal application of fertilizers in rainfed sorghum *R. Jagannathan*
R. 8. Agron. 222	Trial on the depth of sowing and pre-treatment of maize *O. S. Kandasamy*
R. 8. Agron. 223	Experiment on the efficiency of Azotobacter on rainfed cotton *P. Senthamil selvan*
R. 8. Agron. 324	Studies on multiple and relay cropping under garden land conditions *P. Senthamil selvan*
R. 8. Agron. 225	Experiment to assess the efficiency of slow release fertilizers on rainfed cotton *P. Senthamil selvan*
R. 8. Ag. Bot. 202	Evoluation of high yielding varieties of rice resistant to adverse soil conditions *J. Chandra Mohan*

R. 8. Ag. Bot. 203 Evolution of high yielding ragi strains suitable for rainfed tract of Dharmapuri district
P. Rangasamy

R. 8. Ag. Bot. 204 Developing high yielding short duration compact type of redgram suitable for rainfed conditions
K. Mahudeswaran

R. 8. Ag. Bot. 205 Development of high yielding greengram, blackgram and soybean varieties suitable for rainfed areas and rice fallows in Dharmapuri district
K. Mahudesweran

R. 8. Ag. Bot. 206 Evolution of short duration high yielding strain of sorghum with good grains and fodder suitable for irrigated and rainfed area
P. Rangaswamy

R. 8. Ag. Bot. 207 Identification of suitable variety of groundnut for growing under rainfed condition
P. Rangaswamy

R. 8. Ag. Bot 208 Breeding for a short duration variety of cotton with medium staple and tolerance to drought for the harsh ecological zone of Tamil Nadu
S. Suresh

R. 8. Ag. Bot. 209 Evolution of high yielding early varieties of rice maturing in less than 100 days and possessing a high degree of resistance to pests and diseases
J. Chandra Mohan

R. 8. Ag. Bot. 210 Evolution of high yielding pest and disease resistant strains of rice of 100 - 120 days duration
J. Chandra Mohan

R. 8. Ag. Bot. 211 Evolution of improved strains of rice of 120 - 140 days duration combining high yield potential and resistance to major pests and diseases
J. Chandra Mohan

R. 8. Ag. Bot. 215 Evolution of cumbu strains suitable for rainfed conditions of Dharmapuri disttrict
P. Rangasamy

R. 8. Ag. Bot. 216 Evolution of samai and varagu suitable for Dharmapur district
P. Rangasamy

R. 8. Ag Bot 217 Evolving high yielding horsegram variety to replace the local varieties
J. Chandra Mohan

R. 8 Ag. Bot. 221 Evaluation of high yielding short duration drought tolerant varieties of cowpea and lab-lab for rainfed area in Dharmapuri district
J. Chandra Mohan

R. 8. Ag Bot. 222 Evaluation of varieties with suitable plant type of redgram, blackgram, greengram, lab-lab and cowpea for bund cropping
M. Suresh

SOIL SCIENCE AND AGRL. CHEMISTRY, PAIYUR

R. 8 SS & AC. 201 Response of certain crops to potash fertilization
P. Muthuswamy

R 8. Hort. 201 Evaluation and identification of tomato, brinjal and bhendi varieties for growing throughout the year in Dharmapuri district
C. P. Subramanyam

R. 8. Hort. 202 Evaluation of suitable varieties of cabbage, cauliflower and beans for growing in Dharmapuri district during winter months
C. P. Subramanyam

R 8. Hort. 203 Study of tuber crops like tapioca and sweet potato for obtaining maximum yield under Dharmapuri district conditions
C. P. Subramanyam

R. 8. Hort. 204 Collection and assessment of the varieties of jasmine, rose, tuberose and crossandra for Dharmapuri district
C. P. Subramanyam

UNIVERSITY RESEARCH CENTRE, ADUTHURAI

R. 9. Agron. 201 Trial on the influence of age of seedling on grain yield of *Kuruvai* rice
A. Sheik Dawood

R. 9. Agron. 202 Nitrogen management trial for increasing the N use efficiency under lowland rice during *Thaladi*
A. Sheik Dawood

R. 9. Agron. 203 Trial on harvest of rice at its physiological maturity stage during *Kuruvai* and *Thaladi* seasons
A Sheik Dawood

R. 9. Agron. 204 Effect of Neem cake blended urea on the yield of low land rice during *Thaladi* season
A. Sheik Dawood

R. 9. Agron. 205 Effect of time of application of 'P' to low land rice during *Thaladi*
A. Sheik Dawood

R. 9. Agron. 206 Low cost technology demonstration trial on rice
A. Sheik Dawood

R. 9. Agron. 208 Trial on date and method of sowing of cotton in rice fallows
A. Sheik Dawood

R. 9. Ag.Bot. 201 Evolution of high yielding early varieties of rice maturing in less than 100 days and possessing high degree of resistance to pests and diseases
K. M. Balasubramaniam

R. 9. Ag.Bot. 202 Evolution of high yielding pest and disease resistant strains of rice of 100 to 120 days duration
K. M. Balasubramaniam

R. 9. Ag.Bot. 203 Evolution of improved strain of rice of 120 to 140 days duration combining high yield potential and resistance to major pests and diseases
P. Vaithianathan

R. 6. Ag.Bot. 204 Evolution of high yielding strain of rice of 140 to 160 days duration resistant to major pests and diseases
K. M. Balasubramaniam

R. 9. Ag.Bot. 205 Improvement of long duration rice (160 days and above) for high yield and resistance to pests and diseases.
P. Vaithianathan

R. 9. Ag.Bot. 206 Evolution of high yielding varieties of rice resistant to adverse soil conditions
K. M. Balasubramaniam

R. 9. Ag.Ent. 203 Seedling root dip experiment
S. Sadakathulla

R. 9. Ag.Ent. 204 Gall midge biotype study
K. C. Chandy

R. 9. Ag.Ent. 205 Maximum insect pest control trial - estimation of losse due to insect pests
K. C. Chandy

R. 9. Ag.Ent. 207 Minimum protection trial
S. Sadakathulla

R. 9. Ag.Ent. 208 Pest management trial
K. C. Chandy

R. 9. Ag.Ent. 209 Detailed investigations on the assessment of losses to rice by rats
S. Sadakathulla

R. 9. Ag.Ent. 210 Studies on the seasonal effects on biological activities of rats
S. Sadakathulla

R. 6. Ag.Ent. 211 Control of rats by various methods
S. Sadakathulla

R. 9. Ag.Ent. 212 Brown plant hopper screening and biotype studies (BPHS)
S. Sadakathulla

R. 9. Ag Ent. 214 Economic insect pest control trial
K. C. Chandy

R. 9. Ag.Ent. 215 New insecticide trial (NIT - 3 dusts)
S. Sadakathulla

R. 9. Pl. Path. 201 Studies on bacterial leaf blight
N. Jaleel Ahmed

R. 9. Pl. Path. 202 Screening for brownspot
A. Palaniswami

R. 9. Pl. Path. 203 Studies on rice blast
N. Jaleel Ahmed

R. 9. Pl. Path. 204 Survey of rice diseases and pests
N. Jaleel Ahmed & K. C. Chandy

R. 9. Pl. Path. 206 Survey and investigation of virus and virus like diseases for assessing relative resistance
N. Jaleel Ahmed

R. 9. Pl. Path. 208 Studies on the incidence of BPH in known resistant varieties for grassy stunt
A. Palaniswami

R. 9. Pl. Path. 209 Chemical control of sheath rot disease of rice
A. Palaniswami

R. 9. Pl. Path. 210 Chemical control of brown spot and grain discolouration
A. Palaniswami

R. 9. Pl. Path. 211 Insecticidal control of tungro disease
N. Jaleel Ahmed

COCONUT RESEARCH STATION, VEPANKULAM

R. 10. Ag. Bot. 207 Utilisation of existing germplasm and description varieties
T. Ramanathan

R. 10: Ag. Bot. 205 Production of new cross combination
T. Ramanathan

R. 10. Ag. Bot. 208 Study of inter and intra varietal hybridisation in coconut
T. Ramanathan

R. 10. Ag. Bot. 202 Progeny studies in coconut
M. Baskaran

R. 10. Ag. Bot. 203 Study of semi tall varieties from Kanyakumari
M. Baskaran

R. 10. Ag. Bot. 204 Calibration of existing adult palms in the plantation
S. Manamohanlal

R. 10. Ag. Bot. 206 Trial of promising seed materials
S. Manamohanlal

R. 10. Agron. 201 Spacing cum manurial experiment
S. Manamohanlal

R. 10. Agron. 204 Root studies in relation to different agronomic practices
S. Manamohanlal

R. 10. Agron. 208 Irrigation cum fertilizer experiment on hybrid coconut
S. Manamohanlal

R. 10. Agron. 202 Depth of planting experiment

R. 10. Agron. 206 Study of seasonal variation and flower production coconut
R. Balasubramanian

R. 10. Agron. 210 Observational trials with hormones for increased fruit s
R. Balasubramanian

R. 10. Agron. 211 Intercultivation Vs Weed control by herbicides in ad bearing plantation
R. Balasubramanian

R. 10. Agron. 212	**Efficacy of different soil moisture conservation measures** *R. Balasubramanian*
R. 10. Agron. 203	**Studies on the effect of manuring, irrigation and interculti-vation on the growth and yield of coconut** *T. Ramanathan*
R. 10. Agron. 205	**Inter cropping and mixed cropping trial** *T. Ramanathan*
R. 10. Agron. 207	**Studies on the effect of major nutrients on East Coast Tall variety**
R. 10. Agron. 209	**Study on the effect of summer irrigation on coconut palms**
R. 11. Pl. Path. 201	**Scheme for the investigation of coconut wilt disease in Tamil Nadu** *M. Baskaran*
R. 10. Pl. Path. 201	**Role of fertilizers in Thanjavur wilt of coconut** *M. Baskaran*
R. 10. Pl. Path. 202	**Control of Thanjavur wilt of coconut by using organic manures** *M. Baskaran*
R. 10. Pl. Path. 203	**Role of irrigation in the control of Thanjavur wilt** *G. Chandrasekar*
R. 10. Pl. Path. 204	**Control of pencil point disease of coconut** *G. Chandrasekar*

ALL INDIA COORDINATED RESEARCH PROJECT ON SUGARCANE, CUDDALORE

R. 13. Agron. 201	**Zonal varietal trial** *K.V. Daniel*
R. 13. Agron. 202	**Fluff exchange** *K.V. Daniel*
R. 13 Agron. 209	**Trial on cropping patterns with sugarcane** *K.V. Daniel*
R. 13. Agron. 210	**Sheath moisture studies** *K.V. Daniel*
R. 13. Agron. 211	**Comparative study of short duration cropping system in sugarcane** *K.V. Daniel*

R. 13. Agron 207 Development of short duration commercial varieties of sugarcane

R. 8 Hort. 202 To select suitable varieties of cabbage, beans and cauliflower for growing in winter months
C.P. Subramanian

R. 8. Hort. 203 Studies on tubercrops including potato, tapioca and sweet potato for obtaining maximum yield
C.P. Subramanian

ICAR SCHEME, AICRIP, ADUTHURAI

R. 9. Ag. Bot. 202 Evolving high yielding, pests and disease resistant strains of rice 100 - 120 days duration
K.M. Balasubramaniam

R. 9. Ag. Bot. 204 Evolving high yielding strains of rice of 140-160 days duration with resistance to major pests and diseases
K.M. Balasubramaniam

R. 9. Ag. Bot. 206 Evolving high yielding varieties of rice,resistant to adverse soil conditions
K.M. Balasubramaniam

R. 9. Agron. 209 Studies on the incidence of brown hopper as affected by variety, N levels and cultural practices
V. Subbiah

R. 9. Ag. Ent. 203 Seedling dip experiment
K.C. Chandy

R. 9. Ag. Ent. 204 Gall midge biotype studies
K.C. Chandy

R. 9. Ag. Ent. 212 Brown plant hopper screening and biotype studies
K.C. Chandy

R. 9. Pl. Path. 201 Studies on Bacterial leaf blight. Effect of stable bleachin powder on bacterial leaf blight
N. Jaleel Ahmed and *A. Palaniswami*

R. 9. Pl. Path. 202 *Helminthosporium* screeing trial
N. Jaleel Ahmed and *A. Palaniswami*

R. 9. Pl. Path. 203 Studies on rice blast
N. Jaleel Ahmed and *A. Palaniswami*

R. 9. Pl. Path. **206** **Survey and investigation on virus and virus like diseases for assessing relative resistance in rice varieties**
N. Jaleel Ahmed and *N. Palaniswami*

CASHEW RESEARCH STATION, VRIDHACHALAM

R. 14. Hort. 101 Germplasm collection of cashew
V. Palaniswamy

R. 14. Hort. 201 Hybridisation and selection in cashew
V. Palaniswamy

R. 14. Hort. 203 Comparative performance of clones and seedlings in cashew
V. Palaniswamy

R. 14. Hort. 204 Propagation trials in cashew
V. Palaniswamy

R. 14. Hort. 205 Pruning trial in cashew
M. Vijayakumar

R. 14. Hort. 206 Hormonal application studies in cashew
V. Palaniswamy

R. 14. Hort. 207 Comparative yield trials
M. Vijayakumar

R. 14. Hort. 208 Manurial trial in cashew
V. Palaniswamy

R. 14. Hort. 209 NPK fertilizer experiment
M. Vijayakumar

R. 14. Hort. 210 Intensive cultural trial in cashew
A. Shahul Hameed

R. 14. Hort. 211 Experiment on foliar application of urea
A. Shahul Hameed

R. 14. Hort. 212 Studies on control of stem borer
M. Vijayakumar

R. 14. Hort. 113 Top working studies in cashew
M. Vijayakumar

ALL INDIA COORDINATED RESEARCH PROJECT ON OILSEEDS, TINDIVANAM

R. 15. Ag. Bot 201. **Evaluation of elite breeding materials in groundnut**
S. Thangavelu

R. 15. Ag. Bot 203. **Improvement of groundnut by breeding**
S. Thangavelu

R. 15. Ag. Bot 205. **Maintenance and evaluation of genetic stock of groundnut**
S. Thangavelu

R. 15. Ag. Bot 208. **Agronomic means of increasing yield of groundnut**
N. Balasubramanian

CASHEW RESEARCH STATION, VRIDDHACHALAM

R. 14. Hort. 201 **Hybridization and selection in cashew**
A Shahul Hameed

R. 14. Hort. 202 **Progeny trial in cashew**
V. Palaniswamy

R. 14. Hort. 214 **Studies on evaluation of suitable varieties of tapioca for extraction of seed oil**
B. Sampathkumar

R. 14. Hort. 215 **Studies to assess optimum density of foliage for tapioca**
P. Rajendran

R. 14. Hort. 216 **Studies on varieties and suitable practices to reduce HCN content**
J. B. M. Md. Abdual Khader

R. 14. Hort. 217 **Evaluation of tapioca varieties with short duration**
P. Rajendran

R. 14. Hort. 218 **Studies on rapid multiplication in Tapioca**
B. Sampathkumar

R. 14. Hort. 219 **Studies on tier system of planting Tapioca**
D. Veeraragavathatham

R. 14. Agron. 201 **Intercropping studies in Groundnut**
C. Rajah

R. 14. Agron. 202 **Groundnut based relay cropping**
R. Mani

R. 14. Agron. 203 **Estimation of reduction in groundnut yield due to delaye sowing under irrigated condition and identification c suitable early maturing variety**
C. Rajah

R. 14. Agron. 205	**Sttdies on the efficacy of low cost technology advocated for groundnut drum rolling** *R. Mani*
R. 14. Agron. 206	**Integrated weed management in groundnut** *R. Mani*
R. 14. SS&AC. 206	Oil analysis of groundnut varieties tested in the trials of *S. Loganathan*
R. 14. SS&AC. 207	Studies on the possibilities of avoiding micronutrients application every year *S. Loganathan*
R. 14. Ag. Ent. 202	Studies on the control of pests of groundnut *S. Manohar*
R. 14. Ag. Ent. 203	Control of major pests of sesamum *M. Mohanasundaram*
R. 14. Ag. Ent. 204	Control of phyllody disease of sesamum by the insecticidal control of the vector *M. Mohanasundaram*
R. 14. Ag. Ent. 205	Screening of varieties of gingelly for resistance to major pests *M Mohanasundaram*
R. 14. Ag. Ent. 101	Studies on Indian Eriophyoidea *M. Mohanasundaram*

CASTOR RESEARCH STATION, POTTANERI

R. 16. Ag. Bot. 201	Breeding of early and uniform maturiug types of castor *S. Palanisamy*
R. 16. Ag. Bot. 202	Induced mutation in castor *S. Palanisamy*
R. 16. Ag. Bot. 203	Evolution of high yielding hybrid castor *S. Palanisamy*
R. 16. Ag. Bot. 101	Maintenance of germplasm bank of castor *S. Palanisamy*

All INDIA COORDINATED DRYLAND RESEARCH PROJECT, KOVILPATTI

R. 17. Ag. Bot. 203 Crop substitution studies - Cereals
R. Jayaram

R. 17. Ag. Bot. 204 Crop substitution studies - Cereals as fodder
R. Jayaram

R. 17. Ag. Bot. 205 Evaluation of breeding materials/germplasm and selection of promising greengram varieties
G. Soundrapandian

R. 17. Ag. Bot. 206 Evaluation of breeding materials/germplasm and selection of promising blackgram varieties
G. Soundrapandian

R. 17. Ag. Bot. 207 Evaluation of breeding materials/germplasm and selection of promising redgram varieties
G. Soundrapandian

R. 17. Ag. Bot. 208 Evaluation of breeding materials/germplasm and selection of promising Cowpea varieties
G. Soundrapandian

R. 17. Ag. Bot. 211 Evaluation of high yielding stable sorghum varieties/hybrids suitable for rainfed black soil tract
G. Soundrapandian

R. 17. Ag. Bot. 212 Evaluation of high yielding stable bajra varieties/hybrids suitable for rainfed black soil tract
G. Soundrapandian

R. 17. gg. Bot. 213 Evaluation of high yielding stable varieties of panivaragu and kudiraivali suitable for rainfed black soil tract
G. Soundrapandian

R. 17. Ag. Bot. 221 Evaluation of breeding materials/germplasm and selection of promising sunflower varieties
R. Jayaram

R. 17. Ag. Bot. 222 Evaluation of breeding materials/germplasm and selectio of promising safflower and castor varieties
R. Jayaram

R. 17. Ag. Bot. 223 Evaluation of breeding lines of early duration field lab-la (Mochai) varieties with synchronous maturity for drylan
G. Soundrapandian

R. 17. Agron. 202	Crop intensity studies - Study of crop mixture with optimum plant population of sorghum and bajra *S. R. Chowdappan*
R. 17. Agron. 204	Spacing trials on sorghum *V. Kunasekaran*
R. 17. Agron. 206	Efficacy of weeding tools and mulches on sorghum *V. Kunasekaran*
R. 17. Agron. 209	Striga control in sorghum *V. Kunasekaran*
R. 17. Agron. 210	Maximisation of yield experiment *S. R. Chowdappan*
R. 17. Agron. 221	Verification trials on farmer's holdings *R. Jayaram*
R. 17. SS&AC 203	Fertilizer use in dryland agriculture-efficacy of DAP (Vs) Super phosphate on Blackgram *B. Chandrasekaran*
R. 17. SS&AC 208	Soil moisture studies in relation to different methods of sowing in sorghum *C. N. Venkataraman*
R. 17. SS&AC 209	Phosphorus fixation studies in sorghum *B. Chandrasekaran*
R. 17. SS&AC 210	Study on the soil Characteristics of the experimental field in Black soil *C. N. Venkataraman*
R. 17. SS&AC 204	Soil moisture studies in relation to maximisation of yield Experiment *N. M. Thiyagarajan*
R. 17. SS&AC 205	Conservation of moisture with reference to reduction of seepage *N. M. Thyagarajan*
R. 17. SS&AC 206	Soil moisture studies in relation to mulch *N. M. Thyagarajan*
R. 17. SS&AC. 210	Mitigating the adverse effects of drought on crop nutrition of Blackgram *C. N. Venkataraman*

R. 17. S.W.C. 201 Stand establishment of crops - Trial on seeding practices for sorghum
R. Jayaram

R. 17. S.W.C. 202 Soil moisture studies in relation to mulching experiment in sorghum
R. Jayaram

R. 17. S.W.C. 203 Water harvesting and run-off recycling - supplemental irrigation with sorghum
S. R. Chowdappan

R. 17. S.W.C. 204 Water harvesting - Studies on lining materials to reduce seepage loss from farm pond
R. Jayaram

ALL INDIA COORDINATED COTTON IMPROVEMENT PROJECT, KOVILPATTI

R. 17. Ag. Bot. 214 Breeding an American variety of cotton superior to MCU 6 (Bharathi) for the rainfed tract of Tamil Nadu
A. D. Devotta, M. Bagavandoss, S. Kuppusamy, N. Subramanian

R. 17. Ag. Bot. 216 Breeding a hybrid cotton for the rainfed tract of Tamil Nadu
A. D. Devotta, M. Bagavandoss, S. Kuppusamy, N. Subramanian

R. 17. Agron. 217 Studies on planting pattern and intercropping in cotton
A. A. Dason

R. 17. Agron. 218 Maximum yield potential trial
A. A. Dason

R. 17. Agron. 223 Agronomic studies on new varieties in relation to their plant densities and fertilizer levels
A. A. Dason

R. 17. Agron. 226 Studies on methods of planting and interculture practices for efficient utilisation of moisture in rainfed cotton
A. A. Dason

ALL INDIA COORDINATED VEGETABLE IMPROVEMENT PROJECT (CHILLIES) KOVILPATTI

R. 17. Hort. 101 Evaluation of germplasm of Capsicum under irrigated condition
I. R. Suthanthirapandian

R. 17. Hort. 201 **Breeding varieties superior to K1 and K2**
I. R. Suthanthirapandian

R. 17. Hort. 202 **Performance of types or strains of chillies**
M. Elangovan

R. 17. Hort. 203 **Companion crop of onion with chilli**
M. Elangovan

DROUGHT PRONE AREAS PROGRAMME, KOVILPATTI

R. 17. Ag. Econ. 201 **Farm structure study**
P. Selvaraj

R. 17. Ag. Econ. 202 **Economic analysis of new farming practices**
P. Selvaraj

R. 17. Ag. Econ. 204 **Study on the adoption and diffusion of new farming technology**
P. Selvaraj

R. 17. Ag. Econ. 205 **Efficacy of production inputs individually and in combination in rainfed bajra**
P. Selvaraj

COTTON RESEARCH STATION, SRIVILLIPUTHUR

R. 18. Ag Bot. 204 **Breeding a variety of cotton superior to MCU 8 for the long duration rice fallows of Tamil Nadu**
N. Natarajan

R. 18. Ag. Bot. 208 **Breeding an early maturing variety of cotton superior to MCU 7 for short duration rice fallows of Tamil Nadu**
G. Balakrishnan

R. 18. Agron. 204 **Studies on the use of herbicide for weed control in cotton**
A. Chamy

R. 18. Agron. 205 **Maximum yield potential trial**
A. Chamy

R. 18. Agron. 206 **Studies on the use of azotobacter in economising nitrogen fertilizers**
B. Syed Nazeer

R. 18. Agron 207 **Agronomic requirements of the new varieties in relation to their plant densities**
A. Chamy

R. 18. Agron. 208 Efficacy of slow release nitrogen fertilizers in cotton
A. Chamy

R. 18. Ag.Bot. 207 Synthesising a hybrid cotton suitable for summer irrigated tract of Tamil Nadu
N. Natarajan

R. 18. Ag.Bot. 211 Breeding a variety of cotton of 135-160 days duration for medium rice fallows of Tamil Nadu
G. Balakrishnan

R. 18. Agron. 208 Efficacy of slow release nitrogen fertilizers in cotton
A. Chamy

R. 18. SS&AC. 201 Studies on the nutrients requirements of cotton
V. Velu

R. 18. SS&AC. 203 Nutrient requirements of cotton in fixed cropping sequence
V. Velu

R. 18. Ag. Ent. 201 Screening of world collection of germplasm for resistance to jassids
A. Regupathy

R. 18. Ag. Ent. 202 Screening of germplasm and breeding materials of cotton for resistance to bollworms
A. Regupathy

R. 18. Ag. Ent. 203 Studies on the chemical control of insect pests on cottor
A. Regupathy

R. 18. Pl. Path. 201 Screening of germplasm and other breeding material: for different diseases affecting cotton
A. Regupathy

R. 18. Pl. Path. 202 Control of important diseases of cotton
A. Regupathy

R. 18. Pl. Path. 203 Adhoc trial on the control of foliar diseases of cotton
A. Regupathy

R. 19. Agron. 202 Testing selected sugarcane clones under varietal trial
V. K. Balakrishnan

R. 1. 9Agron. 203 Evaluation of maize varieties for popularisatian
K. C. Gauthaman

R. 19. Agron. 204 Formulation of package of practices for rice fallow cott
K. C. Gauthaman

R. 19. Agron. 205 Cumulative effect of different levels of Potash under fixed level of phosphorus and two levels of Nitrogen in a four crop rotation
V. K. Balakrishnan

R. 19. Agron. 206 Evaluation of high yielding quality canes for Pondichery region
S. P. Francisnathan

R. 19. Ag. Bot. 201 Evaluation of high yielding early varieties of Rice maturing in less than 100 days and possessing high degree of resistance to pests and diseases.
P. Narayanasamy

R. 19. Ag. Bot. 202 Evaluation of high yielding and pests and disease resistant strains of rice of 100-200 days duration.
P. Narayanasamy

R. 19. Ag. Bot. 203 Evaluation of improved strains of Rice of 120 - 140 days duration resistant to major pests and diseases.
P. Narayanasamy

R. 19. Ag. Bot. 204 Evaluation of high yielding strains of Rice of 140 160 days duration resistant to major pests and diseases.
P. Narayanasamy

R. 19. Ag. Bot. 205 Improvement of long duration varieties of Rice (160 days and above) for high yield and resistant to pests and diseases.
P. Narayanasamy

R. 19. Ag.Bot. 206 Evaluation of ragi varieties and pre release cultures suitable for January and June season
N. S. Loganathan

R. 19. Ag. Bot. 207 Evaluation of bunch type groundnut varieties and pre - release cultures suitable for summer sesaon (Jan - March)
N. S. Loganathan

R. 19. Ag. Bot. 208 Evaluation of blackgram varieties and pre - release cultures suitable for January and June seasons.
N. S. Loganathan

R. 19. Ag. Ent. 201 Survey for incidence of pests of important crops in Pondichery region.
K. Narayanan

R 19. Ag Ent. 202 Control of major pests of rice.
K. Narayanan

R. 18. Agron. 208 Efficacy of slow release nitrogen fertilizers in cotton
A. Chamy

R. 18. Ag.Bot. 207 Synthesising a hybrid cotton suitable for summer irrigated tract of Tamil Nadu
N. Natarajan

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R. 18. SS&AC. 203 Nutrient requirements of cotton in fixed cropping sequence
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N. S. Loganathan

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K. Narayanan

R 19. Ag Ent. 202 Control of major pests of rice.
K. Narayanan

R. 19. Ag. Ent 203 Control of major pests of ragi.
K. Narayanan

R. 19. Fish. 201 Composite fish culture.
V. Sundararaj

HORTICULTURAL RESEARCH STATION, THADIYANKUDISAI

R. 20. Hort. 202 Investigation on vegetables
K. S. Subramaniam

R. 20. Hort. 203 Economics of mixed cropping
I. Irulappan

R. 20. Hort. 204 Package of practices for Pineapple
E. Vadivel

R. 20. Hort. 205 Introduction of Clonal types of cardamom and screeni types reistant to Katte disease
M. Kulasekaran and I. Irulappan

R. 20. Hort. 206 Cultural and manurial requirements of cardamom
M. Kulasekaran and I. Irulappan

R. 20. Hort. 207 Control of pests of cardamom
A. Regupathy and T. G. Naganathan

R. 20. Hort. 208 Studies on propagation of sugarbeat
E. Vadivel

R. 20. Hort. 209 High density planting in banana
E. Vadivel

R. 20. Hort. 210 Maximisation of oil content of patchouli
M. Kulasekaran and I. Irulappan

R. 7. Hort. 233 Selection and improvement of high yielding varietie beans
G. Paranjothi and E. Vadivel

R. 7. Hort. 234 Evaluation and improvement of radish
G. Paranjothi and E. Vadivel

R. 7. Hort. 235 Standardisation of seed production techniques in Cab and Cauliflower
G. Paranjothi and E. Vadivel

R. 20. Pl.Path. 201 Evolving methods to detect bunchy top virus in banana suckers
K. S. Subramanian

R. 20. Ag.Ent. 201 Control of bunchy top of banana disease through the control of the vector
T. G. Naganathan

HORTICULTURAL RESEARCH STATION, YERCAUD

R. 21. Agron. 201 Working out optimum farm plan and comparative economics of mixed farming to suit the farmers of Yercaud
A. Mohamed Ali

R. 21. Agron. 202 Study to evolve an optimum size of dairy unit for the small tribal farmers of Yercaud and maximise income and employment opportunities
K. K. Chandramohan

R. 21. Agron 203 Evolving suitable cropping pattern with different combinations of livestock for small farmers of Yercaud
A. Mohamed Ali

R. 21. Hort. 201 Improvement of Agro-techniques for mandarin orange
S Muthusamy and K. Nanjan

R. 21. Hort. 210 Research on pomegranate
S. Muthusamy and K. Nanjan

R. 21. Hort. 211 Research on fig
S. Muthusamy and K. Nanjan

R. 21. Hort. 212 Research on jack
T. Thangaraj

R. 21. Hort. 213 Research on annonaceous fruits
T. Thangaraj

R. 21. Hort. 224 Research on ber
S. Muthusamy and K. Nanjan

R. 21. Hort. 215 Research on Jaman
T. Thangaraj

R. 21. Hort. 216 Improvement of cardamom
K. Nanjan

FORESTRY RESEARCH STATION, METTUPALAYAM

R. 22. Forest. 201 Stndies on the response of established bamboo stands *(Bambusa bambos)* to cultural practices and rules of felling
K. R. Chandragiri

R. 22. Forest. 202 Studies on the response of bamboo *(Bambusa bambos)* to nitrogen and secondary tillage
K. R. Chandragiri

R. 22. Forest. 205 Improvement of *Eucalyptus tereticornis* through recurrent selection
S. Krishnaswami

R. 22. Forest. 206 Evoluation of a strain in *Eucalyptus* resistant to drought and suitable to dry zones of Tamilnadu
S. Krishnaswami

R. 22. Forest. 207 Studies on floral biology and breeding behaviour in *Eusalyptus*
T. Krishnaswami

R. 22. Forest. 208 Nutriophysiological studies in *Eucalyptus*
R. S Vinaya Vai

R. 22. Forest. 209 Nutriophysiological studies in Bamboo (*Bambusa bambos*)
R. S. Vinaya Vai

R. 22. Forest. 210 Stodies on the response of solid bamboo (*Dendrocalamus striatus*) to nitrogen and secondary tillage
K. R Chandragiri

R. 22. Forest. 211 Evaluation of the efficacy of different systems of farmin *viz.*, agriculture, silviculture, agrisilviculture and silv pasture
V M. Srinivasan

SCHEME ON BIOLOGICAL CONTROL OF COCONUT CATERPILLAR, VANIAMBADI

R. 24. Ag. Ent 201 Studies on biological control of coconut blackhead caterpillar *Nephantis seainopa*
G. Ganesh Kumar

BETELWINE SCHEME, VELUR

R. 30. Pl. Path. 201 Control of Betel vine wilt disease
R. Samiyappan

FISHERY SCIENCE

R. 1. Fish. 201 Studies on the utility of sewage effluents in fish culture and its economics (Coimbatore)
Samual Paulraj

R. 1. Fish. 209 Reproductive biology in marine cat fish with special referance to pituitary utilisation
P. Sridhar

R. 1. Fish. 210 Photoperiodism on the maturity and breeding of crops
K. Venkataramanujam

R. 1. Fish. 211 Selective breeding of crops
K. Venkataramanujam

R. 1. Fish. 212 Hybridization of carps
N. Sukumaran

R. 1. Fish. 213 Preperation of fish feed with agricultural and animal products and feeding trials on carps and cat fishes
K. C. Joseph

R. 1. Fish. 214 Accumulaeion agricultural biodides in freshwater fishes
Samuel Paulraj

R. 1. Fish 215 Effect of pollutants on freshwater fishes (Coimbatore)
Samuel Paulraj

R. 1. Fish. 216 Culture and breeding of freshmater prawn *Macrobrachium maloclmsonii*
G. Sanjeevaraj

R. 1. Fish. 217 Marine prawn culture (Pondicherry)
V. Sundraraj

R. 1. Fish. 218 Culture of murrels
N. Sukumaran

R. 1. Fish. 219 Composite fish culture and fish feed production
N. Sukumaran

R. 31. Fish. 201 Brackish water prawn and fish culture
G. Sanjeevaraj

R- 31. Fish. 202 Effects of thermal effluents on the fishes and prawn in the vicinity of Tuticorin thermal plant
K. Venkataramanujam

KUMARAPERUMAL FARM SCIENCE CENTRE, TIRUCHY

R. 32. Ag. Bot. 201 Evolution of high yielding varieties of rice maturing in less than 100 days and possessing high degree of resistance to pests and diseases.
P. Manivasakam

R. 32. Ag. Bot. 202 Evolution of high yielding pests and disease resistant strains of rice of 100 - 120 days duration
P. Manivasakam

R. 32 Ag. Bot. 203 Evolution of improved sttains of rice of of 120 - 140 cays duration combining eigh yielding poteniial end resistance to major pests and diseases.
P. Manivasakam

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R. 32. Ag. Bot 205 Evolution of long duration varieties of rice of 160 days and above for high yield and resistance to pests and diseases.
P. Manivasakam

R. 32. Ag. Bot 206 Evolution of high yielding varieties of rice resistant to adverse soil conditions.
P. Manivasakam

R. 32. Ag. Bot 207 Development of Improved rice varieties resistant to drough
P. Manivasakam

R. 32. Ag. Bot. 208 Breeding of high yielding hybrids and varieties of Sorghum suited for the monsoon conditions of Tiruchy tract
P. Manivasakam

R. 32. Ag. Bot. 209 Breeding and evolution of high yielding cumbu varieties and hybrids suited to monsoon conditions
P. Manivasakam

R. 32. Ag. Bot, 210 Evolution of high yielding varieties and Ragi strains for Tirnchy District.
P. Manivasakam

R. 32 Ag Bot 211 Evolution of high yielding gingelly and groundnut strains suited to dry and irrigated conditions of Tiruchy tract.
P. Manivasakam

R. 32. Agron. 201 Effect of planting methods and management practicies of rice in alkaline soils.
S. Ramiah

R. 32. A. H. 201 Evolution of optimum seed rate for sorghum and Sorghum-cowpea combination. Maize and Maive cowpea combination for fodder.
E. S. Venkatesan

R. 32. Hort 222 Evolution of high yielding varieties of cluster beans suitable for Tiruchy region
S. Sundararajan

R. 32. Hort. 223 Selection of coriander types in problem soils.
P. Arukutty

R. 32. Hort. 224 Selection of Bhendhi varieties in problem soils.
P. Arukutty

R. 32. Hort. 201 Evolution of a superior strain of casuarina for maximum biomass yield
M. Stephen Dorairaj

R. 32. Hort. 202 Studies on juvenile - adult correlation for vigour in *Casuarina equisetifolia*
M. Stephen Dorairaj

R. 32. Hort. 203 Studies on the association of sex expression to growth vigour in *casuarina equisetifolia*
M. Stephen Dorairaj

WETLAND BANANA RESEARCH STATION, UYYAKONDAN THIRUMALAI

R. 32. Hort. 201 Maintenance and study of 'Banana Gene' bank
S. Sundararajan

R. 32. Hort. 202 Banana breeding
S. Sundararajan

R. 32. Hort. 203 Investigation on the causes and the control of 'Kottai vazhai' in Poovan.
S Sundararajan

R. 32. Hort. 205 Nutritional requirements of poovan and Nendran banana
S. Sundararajan

R. 32. Hort. 206 Studies on the comparative perfarmance of culinarry banana clones
S. Sundararajan

R. 32. Hort. 207 Spacing cum-density trail in 'Nendran'
S. Sundararajan

R. 12. Hort. 208 Foliar application of urea on 'Poovan'
S. Sundararajan

LIVESTOCK RESEARCH STATION, KATTUPAKKAM

R. 33. LRS. 104 Performance of indigenous pigs (country pigs) under farm conditions
S. Jayarajan

R. 33. LRS. 106 Effect of feeding concentrate in increased quantity for the breeding ewes during the late 1/3 part of (50 oays) gestation period on their milk yield and the growth of lambs against grazing along group of ewes.
D. Ganesh Kale

R. 33. LRS. 201 Determination of genetic parameters of economic traits in large white Yorkshire pigs.
S Jayarajan

R. 33. LRS. 202 Genetic studies in sheep estimation of genetic parameters of Madras red and Mandya breeds of sheep
D Ganesh Kala

NATIONAL PULSES RESEARCH CENTRE, VAMBAN

R. 35. Agron. 201 Response of greegram varieties to population density and phosphate levels.
A. Subramanian

R. 35. Agron. 202 Fertilizer studies on greengram under irrigated condition
A. Subramanian

R. 35. Agron. 203 Response of blackgram varieties to population density and phosphate levels
K. Vairavan

R. 35. Agron. 204 Fertilizer studies on blackgram under irrigated condition.
K. Vairavan

R. 35. Agron. 205 Response of redgram to phosphate levels and inoculation with and without nitrogen under rainfed condition.
G. Ramdoss

R. 35. Agron. 206 Inter - cropping studies with medium duration redgram under rainfed conditions.
G Ramdoss

R. 35. Agron. 207 Inter - cropping with long duration redgram under rainfed conditions.
G. Ramdass

R. 35. Agron. 208 Studies on pre soaking seeds of greengram in nutrient solution under rainfed condition
Dr. A. Subramanian

R. 35. Agron. 209 Effect of spacing on horsegram varieties
K. Veeravan

R. 35. Ag. Ent. 208 Studies on the varietil resistance of greengram with reference to their ecology.
Dr. M. Gopalan

R. 35. Ag Ent. 209 Screening of varieties of horsegram and blackgram resistance to major pests.
R. Rajendran

R. 35. Microbio. 201 Screening of rhizobial strains for their efficiency in different pulses.
Dr. A. Balasubramanian

R. 35. Microbio. 202 Screening of germplesm collections of pulses for nodultion to the native and introduced strains of rhizobia.
Dr. A. Balasubramanian
Dr. M. Rangarajan

R. 35. Microbio. 203 Interaction between plant protectiod chemicals and the legume rhizobia symbiosis under varied agro - climatic conditions
Dr. M. Rangarajan & Dr. A. Balasubramanian

MADRAS VETERINARY COLLEGE, MADRAS
ANIMAL NUTRITION

R. 25. A. N. 105 Use of urea in feeding of kids
P. Ayyaluswamy

R. 25. A. N. 106 The effect of salinity and total hardness of water on growth of chicks
P. Ayyaluswamy

R. 25. A N. 107 Cost of pork production on non-cereal ration
R. Kadirvel

R. 25. A. N .108 Koo babool *(Leucaena leucocephala)* meal as a poultry feed Ingredient
R Ayyalusamy

R. 25. A N. 109 Preparation and use of human hair meal as a protein supplement for poultry feeding
R. Kadirvel

R. 25. A. N. 110 *Intro* evaluation of NB 21, napier and paragrass
J. Ernest

R. 25. A. N. 111 *Invitro* evaluation of cowpea, sunhemp, and lucerne
J. Ernest

R. 25. A. N. 201 Estimation of nitrite in NB 21 grass at different levels of fertiliser application and at different stages of cutting
V. Jaganathan

R. 25. A. N. 112 Auicennia meal as afeed for sheep
V Jaganathan

ANIMAL GENETICS

R. 25. A. G. 204 Investigation with the quantitative aspects of Vitamin A and B Carotene. Desoxyribonucleic acid and ribonucleic acid of buffalo semen

R. 25. A. G 205 Chromosomal studies in animals and human beings

R. 25. A. G. 104 Study on the efficiency of index selection for short term egg mass in development of a high egg yielding strain of poultry

R. 25. A. G. 105 Study on the performance of exotic crossing of cattle under field conditions in Tamil Nadu

R. 25. A. G. 207 Effect of Tris (Hydroxymethyl) aminomethan, Sodium citrate and lactose diluents on cytomorpholopy of bull sperm during storage
Austin Stephens

R. 25. A. G. 208 Comparative study of the revival rate and fertility rate of Murrah buffalo spermatozoa frozen in smaller (mini 0.25ml.) and larger (medium 0.5 ml) capillary tubing at 196°C
Austin Stephens

R. 25. A. G. 209 Deep freezing of buffalo semen under field condition
M. John Edwin

R. 25. A. G. 210 Deep freezing of dog semen for artificial breeding
M. John Edwin

R. 25. A. G. 211 Deep freezing of ram semen
J Kalatharan

R. 25. A. G. 106 Determinig the correct site of deposition of frozen semen to achieve optimum conception rate with medium and mini straws
J. Kalatharan

R. 25. A. G. 212 Chromosome studies in some important helminth parasites affecting livestock
Jeyaseelan Chellappa

R. 25. A. G. 213 The effect of the levels of cations of buffalo semen characteristics
K. Kanakaraj

R. 25. A. G. 214 Studies on influence of season and period of oestrus on the conception rate in crossbred cattle in Madras city
S. Blachandran

ANATOMY

R. 25. Anat. 201 Histological studies on skin of cattle
V. K. Seshadri

R. 25. Anat. 202 Studies on the histology of bladder of the Indian buffalo (Bubalus Bubalis)
G. Kannamani

R. 25. Anat. 203 Studies on the anatomy and cytoarchitecture of the cerebral cortex of the Indian buffalo
V. K. Seshadri

R. 25. Anat. 204 Studies on the histology of the tongue of the Indian buffalo (Bubalus bubalis)
Kannamani

R. 25. Anat. 205 Studies on the presence of Mast cells in the salivery gland of Indian buffalo
A. Venkatakrishnan

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S. Shyamasundaram

R. 25. Hyg. 106 Productive performances of exotic and cross bred cows under Tamil Nadu farming conditions
M. Thiagarajan

R. 25. Hyg. 107 Environmental pollution studies in an organised slaughter establishment
R. S. Viswanathan

R. 25. Hyg. 108 Study of marketing potentials of pork in Madras city
R. Prabaharan

MEAT HYGIENE

R. 25. M. H. 102 Utilisation of chicken meat of spent breeding stock as sausage meat
R. Ramamurthi

R. 25. M. H. 103 Study on the preparation and shelf life of vinegar pickled pig feet
V. T. Kosalaraman

R. 25. M. H. 104 Preparation and quality study of cara beef wafer
E. S. Venkatesan

R. 25. M. H. 105 Enzymatic tenderization of mutton
K. T. Radhakrishnan

R. 25. M. H. 106 Studies on the packaging and marketing of pork
C. V. Govindarajan

R. 25. M. H. 202 Studies on the preparation of poptone from blood

MICROBIOLOGY & BIOCHEMISTRY

R. 25. M. B. 102 Surveillance of Johne's disease in sheep
R. A. Balaprakasam

R. 25. M. B. 201 Electrophoretic analysis of serum protein of animals in health and disease
J. S. Moses

R. 25. M. B. 103 Hatchery sanintation
A. T. Venugopal

R. 25. M. B. 104	Studies on immunogenicity of CLF. 66 Lentogenic strain of New castle disease virus in comparision to F & K strains of Ranikhet disease virus
R. 25. M. B. 105	Immunogenicity with tissue culture adapted fowl pox virus vaccine *A. T. Venugopal*
R. 25. M. B. 106	Ontogeny of immune response in chicks to antigens *K. Nachimuthu*
R. 25. M. B. 107	Indentification of meats by starch gellzone electophoresis *G. Thulasi*
R. 25. M. B. 108	Studies on antigenic variation in the virulent (field) fowl pox virus strains
R. 25. M. B. 109	Cultivation of ovine strain of *Mycobacterium paratuberculosis* *A. Albert*
R. 25. M. B. 202	Assessment of immunity of poultry for Ranikhet disease in Madras *D. Janakiram*
R. 25. M. B. 203	Associated microorganisms with bovine and canine dermatitis and their biological significance *R. A. Venkatesan*
R. 25. M. B. 204	Morphological characterisation of the variety of pox group of viruses of sheep and goat skins *R. A. Venkathsan*
R. 25. M. B. 205	Epidemiology of coliform contamination in milk with particular reference to enterogenic *E. coli* *K. S. Palaniswamy*
R. 25. M. B. 206	*E. coli* entero-toxin in milk and meat *K. S. Palaniswamy*
R. 25. M. B. 207	Rapid diagnostic methods for isolation and identification of *Bacillus anthracis* from animal by products *A. Albert*
R. 25. M. B. 208	Bacterial etiology of perinatal lamb mortality *N. Durairajan*

R. 25. M. B. 209 Bacterial flora of unhatched eggs
N. Durairajan

R. 25. M. B. 210 Coliform mastitis
C. Venkatasubba Rao

PATHOLOGY

R. 25. Path. 102 Studies on the etiology and pathology of chronic bovine hill haematuria
P. V. Ramachandran

R. 25. Path. 103 Transmissible venereal tumour in canines
R. Krishnan

R. 25. Path. 104 ICAR Scheme for the study of neoplasm of the upper respiratory tract in bovines
P. Richard Masillamony

R. 25. Path. 105 Urine analysis in spontaneous cases of chronic bovine hill haematuria
P. V. Ramachandran

R. 25. Path. 106 Haematological studies in bracken fern fed animals for the induction of bovine hill haematuria and controls

R. 25. Path. 107 Studies to detect the presence of antinucler antibody in sinus tumour animals
P. Richard Masillamony

R. 25. Path. 108 Studies on exfoliative cytology in neoplasms of upper respiratory tract in direct fluorescent aotibody test
P. Richard Masilamony

R. 25. Path. 109 Survey of the incidence of neoplasm In the upper respiratory tract of bovines belonging to the livestock farms in Tamil Nadu
K. Veeraraghavan

R. 25. Path. 110 Studies on the prenatal mortality in lambs
S. Nagarajan

R. 25. Path. 202 Studies on tuberculosis in animals
R. Ramakrishnan

R. 25. Path. 203 Studies on hepatic diseases in pigs

R. 25. Path. 204 Histopathology of spontaneous cases of neoplasm of the upper respiratory tract in bovines
K. Veeraraghavan

R. 25. Path. 205 Histopathological study of liver diseases in bovines in Tamil Nadu
S. Viswanathan

R. 25. Path. 206 Studies on paralysis in chicks
K. R. Parthasarathy

R. 25. Path. 207 Studies on liver lesions in poultry
K. R. Parthasarathy

R. 25. Path. 208 Histopathological survey of pulmonary lesions in ovines
S. A. Shakhir

R. 25. Path. 209 Studies on pulmonapathy of bovines in Tamil Nadu
S. A. Shakhir

R. 25. Path. 210 Studies on growth behaviour of transmissible venerea tumour cells in tissue culture
A. Sundararaj

R. 25. Path. 211 Studies on growth of transmissible venereal tumour cells adapted to tissue culture in experimental dogs
A. Sundararaj

R. 25. Path. 212 Gross and histopathology canine Ehrlichiosis.
B. Muralimanohar.

R. 25 Path. 213 Haemogram in canine Ehrlichiosis
B. Muralimanohar

R. 25. Path. 214 Study of serum protein pattern by electrophoresis in sinus tumour animals
K. Kesavalu

R. 25. Path. 215 Passive haemagglutination in detection of antibodies of bovine sinus neoplasms
K. Kesavalu

PARASITOLOGY

R. 25. Para. 204 Survey of amphistome parasites of ruminants.
C. M. Lalitha

R. 25. Para. 203 Studies on sarcosprodiosis
H. N. Achuthan

R. 25. Para. 210 Studies on tickicides
T. J. Koshy

PHARMACOLOGY

R. 25. Phar. 204 Evaluation of tonic effect of indigenous plants in birds
R. Natarajan

R. 25. Phar. 205 Investigation of the effects of the seeds *Crotalaria juncea* on the reproductive function
R. Natarajan

R. 25. Phar. 206 Pharamacoclinical studies of disophenol in dogs
B. Gowrishankar

R. 25. Phar. 207 Evaluation of the pharmacological studies of morantel tartarate in dogs
B. Gowrishankar

R. 25. Phar. 208 Clinical Veterinary Pharmacological studies of various drugs commonly used in Madras Veterinary College Hospital with special reference to treatment
J. Jayasek-asamuel

R. 25. Phar. 209 Drug interaction studies on metamizole cyproheptadine and phenobarbitone sodium in rats
M. Kanniappan

R. 25. Phar 210 Haemotological effects of paracetamol in the laboratory mice.
Inbaraj Cyrus

PREVENTIVE MEDICINE

R. 25. Pre. Med. 108 Assessment of immunity in vaccinated dogs against rabies by electrophoretic studies
N. Raghavan

R. 25. Pre. Med. 109 Retrospective studies on the effect of climatological factors on the occurrence of Haemoprotozoan infections in bovines and canines in the city of Madras
V. N. Appaji Rao

R. 25. Pre. Med. 107 A study on the usefulness of infected gums scraping for confirming rinderpest in bovines
M. Thanappa Pillai

R. 25. Pre. Med. 204 Diagnosis of fowl spirochaetosis by agar gel precipitation test and by fluorescent antibody technique
P. Ramakrishna Rao

THERAPEUTICS

R. 25. Ther. 103 Nivaquine (Chloroquine sulphate) therapy in bovine Theileriasis
V. V. Nagarajan

R. 25. Ther. 104 Efficacy of Samorin (M & B) in bovine trypanasomiasis
V. V. Nagarajan

R. 25. Ther. 201 Survey of etiology and seasonal variation of bovine indigestion in Madras city

R. 25. Ther. 107 Assessmenr the efficacy of a newer antifrothing agents
V. Gnanapraksam

R. 25. Ther. 106 Non-specfirc dermatitis in calves diagnosis and treatment
V. Gnanaprakasam

R. 25. Ther. 107 Study of the hematalogical aspect of collapse syndrome in young calves as an aid to prognosis and treatment.
A. E. Lazarus

R. 25. Ther. 108 Establishment of immunoglobulin and associatedantibodies in the blood serum with reference to neonatal diseases in calves.
A. E. Lazarus

R. 25. LASC. 202 A study on the normal haemogram of laboratory animals.
R. Srinivasan.

POULTRY SCIENCE

R. 25. PSC. 106 Quality of eggs stored at room temperature through the year
P. Kothandaraman

R. 25. PSC. 107 Comparative assesment studies on the preservation of shell eggs.
I. Alfred Jayaprasad

R. 25. PSC. 108 Effect of position of egg during incubation to improve hatchability.
S. Venkatasubramanian

R. 25. PSC. 109 Studies on the quality of market eggs in the city ofMadras.
K. Vedanayagam

R. 25. PSC. 110 Rice polish as a replacer for maize in broiler ration.
K. Vedanayagam.

R. 25, PSC. 111 Comparative studies on the different methods of preservation of table eggs.
V. Sundararasu

R. 25. PSC. 113 Studies on the keeping quality of liquid egg under refrigerated storage
Augustine Thomas Peter.

R. 25. PSC. 112 Comparative studies on the different methods of preservation of table eggs.
V. Sundararasu

R. 25. PSC. 114 Effect of cold storage on the quality of eggs.
Augustine Thomas Peter.

R. 25. PSC. 204 Studies on the carcass yield of White Leghorn male chicks raised on high protein and low energy.
K. Sundaresan.

POULTRY RESEARCH STATION, MADRAS

R. 34. PRS. 106 Studies on the social behaviour of broiler breeders
S.S *Sathyamoorthy*

R. 34. PRS. 107 Studies on the cacass yield of White Leghorn male chicks raised on high protein and low energy rations (1 : 100) with and without additives
K. Sundaresan

R. 34. PRS. 108 Investigation on the immunological status of birds vaccinated against Ranikhet disease
Mohamed Abdul Khavi

R. 34, PRS. 109 Effect of protein restriction during growing period on the subsequent laying house performance of the broiler replacement pullets
P. Renge Reddy

R. 34. PRS. 110 Artificial insemination in poultry
V. Sethumadhavan

R. 34. PRS. 111 Correlation of body weights with reproductive traits in broiler breeder females
V. Sethumadhavan

R. 34. PRS. 112 Study on the suitability of the broiler for preparation of *Tandoori* Chicken
V. Venkataramanujam

R. 34. PRS. 113 Influence of Polyphosphate in chilling water on shelf-life of broiler dressed chicken
V Venkataramanujam

R. 34. PRS. 114 Studies on the relationship between shape and size of the eggs with hatchability, chick weight and sex of chick
R. Kumararaj

R. 34. PRS. 115 The effect of artificial lighting during incubation on hatchbility
K. Gajendran

R. 34. PRS 116 Effect of strain and age on the egg quality traits
K. Gajendran

R. 34. PRS. 117 Effect of feeding greens on hatchability in White Leghorn layers
K. Viswanathan

R. 34. PRS. 204 All India Co-ordinated Research Project on Poultry for Meat
N. Natarajan

R. 34. PRS. 208 Effect of certain additives on hatchability in broiler strains
S. S. Sathyamoorthy

R. 34. PRS. 209	Studies on the effect of dietary addition of TM-10, 3-Nitro-Hoechst on growing performance of White Leghorn Male-Chicks *K. Sundaresan*
R. 34. PRS. 210	Energy-protein requirements for White Leghorn male chick *F. R. Sheriff*
R. 34. PRS. 211	Studies on the ready-to-cook yield and chemical composition of the White Leghorn male chicks raised on different energy protein mashes *F. R. Sheriff*
R. 34. PRS. 212	Assessment of mortality pattern in different strains of broilers and non-broilers at Poultry Research Station *Mohamed Abdul Khavi*
R. 34. PRS. 213	Studies on the effect of position of hatching eggs during storage period on hatchability in White Rock breed *P. Renga Reddy*
R. 34. PRS. 214	Unconventional feeds - Tamarind seed *R. Kumararaj*

LIVESTOCK RESEARCH STATION, KATTUPAKKAM

R. 33. LRS. 201	Determination of genetic parameters of economic traits in Large White Yorkshire pigs *S. Jayarajan*
R. 33. LRS. 202	Genetic studies in sheep - Estimation of genetic parameters of Madras Red and Mandya breeds of sheep *D. Ganesakale*
R. 33. LRS. 203	Genetic improvement of Madras Red mutton breed of sheep *D. Ganesakale*
R. 33. LRS. 104	Performance of indigenous pigs under farm condition *S. Jayarajan*
R. 33. LRS. 108	Effect of sedatives on the keeping quality of buffalo semen *A. Mahalinga Nainar*
R. 33. LRS. 109	Shrinkage studies in food animals *M. Govindarajulu*

R. 33. LRS. 207 Studies on the effect of season on the normal growth of weaned calves fed on milk and concentrates
B. V. Ramachandran

R. 33. LRS. 208 Effect of post-insemination treatment on repeat breeders in crossbred cows
A. Mahalinga Nainar

R. 33. LRS. 209 Comparative study on economics of production of small dairy units of Murrah buffalo and crossbred cows
B. V. Ramachandran

SHEEP BREEDING RESEARCH STATION, SANDYNALLAH

R. 28. SBRS. 102 Evaluation of production performane of Merino
V. Mohanalingam

R. 28. SBRS. 103 Determination of carrying capacity of sheep in Kikiyui clover cultivated pasture
P. S. Ramasami

R. 28. SBRS. 203 All India Co-ordinated Research Project on Sheep Breeding (Fine wool)
I. M. Rodricks

R. 28. SBRS. 203 Effect of age on the wool quality in Merino and Merino-Nilagiri crossbred sheep
I. M. Rodricks

R. 28. SBRS. 204 Estimation of repeatability co-efficient of wool quality and quantity in farmbred Grozney Merino
V. Mani

SHEEP BREEDING STATION, MECHERI

R. 29. MSRS. 101 Studies on the influence of age on the economics of production and carcass qualities in Mecheri sheep
P. Subramanian

R. 29. MSRS. 201 Impact of environment of heat tolerance in Mecheri sheep
P. Subramanian

APPENDIX IX

THESIS SUBMITTED AND APPROVED DURING 1979 - 80

Title of Thesis	Name of the Student	Name of the Chairman
AGRICULTURAL BOTANY		
Ph. D.		
1. Genetic Analysis of fodder yield components in sorghum (*Sorghum bicolor* (L.) Moench	R. Vaithialingam	Dr. M. Rathinam
2. Studies on induction of variability in rice (*Oryza sativa* L.) through mutagenesis in homozygous and heterozygous genotypes	T.B. Ranganathan	Dr. R. Appadurai
3. Studies on induced mutations in bengalgram (*Cicer arietinum* L.)	K.K. Vadivelu	Dr. M. Rathinam
M.Sc. (Ag.)		
1. Inheritance of earliness and yield components in a six parent diallel cross of rice (*Oryza sativa* L.)	P. Chandramohan	Dr. V.S. Sivasubramanian
2. An analysis of combining ability and heterosis in sorghum (*Sorghum bicolor* L. Moench)	G. Elangovan	Dr. R. Appadurai
3. Induced mutagensis in Lucerne (*Medicago sativa* L.)	A. Jothi	Dr P. Chandrasekharan
4. Cyto-morphological studies in bajra-Napier hybrids (*Pennisetum typhoides* Stapf and Hubb x *P. purpureum* schum)	A.P.M. Kirupakaran Soundararaj	Dr. P. Chandrasekharan

5. Studies on the relationship of grain yield with grain characters and causal schemes of components of yield in genotypes of rice (*Oryza sativa* L.)	M. Manivannan	Dr. V. Sivasubramanian
6. An analysis of combining ability and heterosis in sesamum (*Sesamum indicum*	K. Mathivanan	Dr R. Appadurai
7. An assessment of genetic diversity in pearl millet (*Pennisetum typhoides* (Burm) S & H)	Mohan Andrew Savery	Dr. M.N. Prasad
8. A study of genetic diversity and character associations in fox-tail millet (*Setaria italica* Beaur)	K. Nagarajan	Dr. M N. Prasad
9. Study of metric attributes related to fodder yield in *Echinochloa frumentaceae* link	S.E. Naina Mohamed	Dr. M. Balasubramanian
10. Studies on the influence of three selection indices on yield and yield components of rice (*Oryza sativa* L.)	K. Natarajamoorthy	Dr. V. Sivasubramanian
11. The genetic analysis in different kinds of populations in *Sorghum bicolor* (L.) Moench	M. Pandian	Dr. M. Rathinam
12. Studies on combining ability and heterosis in forage maize (*Zea Mays* L.)	M. Paramathma	Dr. M. Balasubramaniam
13. Genetic diversity and association of characters in relation to grain yield in *Sorghum bicolor* L Moench	Rajan Prasad	M.N. Prasad
14. Studies on variability and Genetic diversity for fodder characteristics in cluster bean (*Cyamopsis tetragonoloba* (L.) Taub	A.S. Shanmugam	Dr. M. Balasubramaniam

15. Biometrical studies on variability, correlation path analysis and genetic divergence in little millet (*Panicum miliare* Lam)	E. Subramaniam	Dr. M. Rathinam
16. Variability, path and D² analysis in forage sun hemp (*Crotalaria juncea* L.)	P. Sundaramoorthy	Dr. M. Balasubramaniam
17. A study of the breeding behaviour of the F¹ and F² generations of the inter specific hybrid, *Arachis hypogaea* (L.) x *Arachis villosulicarpa*	S. Vijayakumar	Dr. R. Appadurai
18. Induced mutagenesis in *Vignamarina* (Burm) Merr. A fodder Legume	P. Vindhiyavarman	Dr. P. Chandrasekharan
19. Studies on yield and yield components and genetic divergence in ragi (*Elusine coracana* Gaertn.)	G. Xavier	Dr. M. Rathinam
20. Genetic analysis of some quantitative characters in forage sorghum (*Sorghum bicolor* (L) Moench)	N.R. Chandrasekaran	Dr. P. Chandrasekharan
21. An evaluation of combining ability and heterosis in Mung bean (*Vigyana radiata* (L) Willozek)	S. Manamohanlal	Prof. A. Subramanian
22. Mutagenic response of *Sorghum vulgare* Pres. To single, Recurrent and Alternate treatments with Gamma rays and Ethyl Methane sulphonate	A. Chandrasekaran	Dr. V.D. Guruswamy Raja
23. Studies on induced genetic variability in cowpea (*Vigna unguiculata* (L) Walp).	P. Murugan	Dr. V.D. Guruswamy Raja
24. Studies on induced mutagenesis in rice (*Oryza sativa* L.)	G. Nallathambi	Dr. V.D. Guruswamy Raja

25. Analysis of variability, genetic diversity and correlation in green gram (*Vigna radiata* (L.) Wilczek	J. Paramasivan	Dr. S. Rajasekaran
26. Biometrical studies in blackgram (*Vigna mungo* L. Hepper)	M. Rasupandi	Dr. S. Rajasekaran
27. Mutagenic effects of gamma rays. Ethyl Methane Sulphonate and Combination treatments on Foxtail millet, (*Setaria italica*)Beauv	R. Ravichandar	Dr. S. Rajasekaran
28. Studies on induced mutations in ragi (*Eleusine coracana* (L) Gaertn) using single and recurrent treatments of Gamma rays	C. Soundararajan	Dr. S. Rajasekaran

AGRONOMY

Ph. D

1. Studies on Ratoon management of hybrid cotton varieties CBS 156	A. Chamy	Dr. Y.B. Morachan
2. Studies on the effect of herbicides, phosphorus, plant density and weather on growth and yield of groundnut (*Arachis hypogaea* L.)	R. Kulandaivelu	Dr. Y.B. Morachan
3. Studies on rice based multiple cropping systems	S. Purushothaman	Dr. SP. Palaniappan
4. Irrigation and Nitrogen management in the cropping system of cotton, sorghum and finger millet as pure and with intercrops of garden lands	G.S. Thangamuthu	Dr. Y.B. Morachan

M. Sc. (Ag.)

1. Sorghum-ratoon system for the south-west and north east monsoon seasons	K. K. Chandragiri	Dr. SP. Palaniappan

2.	Effect of irrigation regimes and nitrogen levels on ragi CO 11 (*Eleusine coracana* Gaerth)	P. Dhandapani	Dr. M R. Iruthayraj
3.	Effect of NAA and nitrogen on growth and yield of cotton MCU 9	R. Jagannathan	Dr. M.R. Iruthayaraj
4.	Studies on response of cowpea (Vigna sinensis L. Savi) to phosphorus and growth regulators	R. Jayaram	Dr. S. Ramiah
5.	Mixed cropping of wheat and gram with different nitrogen levels under rain-fed conditions	V. Jagannathan	Dr. Y.B. Morachan
• 6.	Performance of Soybean varieties in sorghum based cropping systems	S. Jayaraman	Dr. Y.B. Morachan
7.	Ratoon management in sorghum	K. Kanagaraj	Dr. SP. Palaniappan
8.	Studies on the effect of plant density and chemical defoliants on MCU 9 cotton	S. Krishnasamy	Dr. M.R. Iruthayaraj
9.	Intercropping in Groundnut in different moisture regimes	M. Krishnasamy	Dr. SP. Palaniappan
10.	Studies on Nitrogen use efficiency in lowland Rice	R. Mani	Dr. SP. Palaniappan
11.	Studies on the effect of quality of water, irrigation regimes and varieties on growth and yield of Maize	T. Ramanisankar	Dr. Y.B. Morachan
12.	Methods of sowing and foliar nutrition of Diammonium Phosphate on Rice fallow Blackgram (*Vigna mungo* L. Hepper)	S. Ramasamy	Dr. S. Ramiah
13.	Studies on the response of greengram (*Vigna radiata* L. Wilczek) to methods and levels of phosphorus application	P. Rollin Baskar	Dr. S. Ramiah

14.	Effect of Irrigation Regimes and phosphorus levels on Sunflower	S. Somasundaram	Dr. M.R. Iruthayaraj
15.	Studies on Phosphorus and Molybdenum nutrition with rhizobial inoculation in redgram	P. Subbian	Dr. S. Ramiah
16.	Intensity of cropping in Garden land under minimum tillage	P. Vaithianathan	Dr. Y.B. Morachan
17.	Effect of graded levels of Phosphorus, zinc and manganese on yield and yield components of Rice var:- Vaigai	M. Balasubramanian	Dr. K. K. Subbiah
18.	Effect of Nitrogen and Potassium on the incidence of pest and diseases and yield of chilli (*Capsicum annum* L.) var. MDU 1	R. Balasubramanian	Dr. K. K. Subbiah
19.	Effect of irrigation and nitrogen levels on yield components and growth of MDU 1 Brinjal	S.V. Jeevananthan	Dr. S. Subramanian
20.	Studies on Nitrogen management and population density for CO 40 Rice planted with aged seedlings	K. Marimuthu	Dr. K.K. Subbiah
21.	Studies in Ratooning in Sorghum	S. P. Packiaraj	Thiru S. Kolandaisamy
22.	Ratooning studies on Vaigai and Bhavani Rice varieties	A. Palchamy	Thiru S. Kolandaisamy
23.	Studies on the effect of plant density and graded levels of Nitrogen on growth, yield and yield attributes of Chilli (*Capsicum annum* L.) MDU 1	S. Ramachandran	Dr. K. K. Subbiah
24.	Intercropping under different systems of planting in summar irrigated cotton MCU 8	R. Sorgavasan	Thiru S. Kolandaisamy

25.	Cropping Sequence Studies under different irrigation regimes for Periyar-Vaigai Command Area.	S. A. Sundarsingh	Dr. S. Subramaniam
26.	Influence of age of seedlings under different spacings and nitrogen levels on growth and yield components of Ragi (*Eleusine Coracana*) Var. Co 11	K. Vairavan	Thiru. S. Kolandaisamy
27.	Water Management and Phosphorus Nutrition studies on Greengram	M. Vasimalai	Dr. S. Subramanian

SOIL SCIENCE AND AGRICULTURAL CHEMISTRY

Ph. D.

1.	Studies on factors influencing nodulation, nitrogen fixation, uptake of nutrients and yield by different genotypes of blackgram (*Vigna mungo* (L) *Wepper*)	P. P. Ramaswami	Dr. C. Obliswamy
2.	Studies on Magnesium in acid soils of Nilgiris	K, K. Mathan	Dr. Chiranjeevi Rao
3.	Zinc nutrition of rice with special reference to soil condition, varieties, sources and methods of application of Zn	V. S. Krishna Moorthy	Dr. K. K. Krishnamoorthy
4.	Studies on losses of N from soils of Tamil Nadu	M. Guruswamy	Dr. K. Chirajeevi Rao

M. Sc. (Ag)

1.	Studies on the effect of ammendments and Zn on soil chemical properties, yield and uptake of nutrients by rice	P. Duraisamy	Dr. C. V. Kothandaraman
2.	Response of sorghum varieties to Fe application by different methods	T. Kanagaraj	Dr. C. Ramanathan

3.	Fe and Zn interaction studies on maize var. Ganga.5	P. L. Kasiviswanathan	Dr. K. M. Ramanathan
4.	Investigation on physical, chemical characteristics of major soil series of Salem district (Tamil Nadu)	K. R. Kumaresan	Dr. K. M. Ramanathan
5.	N and K interaction studies in bhendi	S. Mani	Dr. K. M. Ramanathan
6.	Studies on the influence of N and stages of cutting on the yield and quality of hybrid napier grass varieties	A. K. Mani	Dr. C. V. Kothandaraman
7.	Studies on the relative efficiency of coated water soluble phosphatic fertilizers on the yield and nutrient uptake of rice var. IR. 20	A. Saravanan	Dr. C. V. Kothandaraman
8.	Studies on the effect of application of nitrogen and iron to Sorghum (Co. 22) grown in two major soil series of Salem district	K. Muthukrishnan	Dr. G. V. Kothandaraman
9.	Nitrogen and Potassium interaction studies in Co 1 and Co 2 Amaranthus	K. Subbiah	Dr. K. M. Ramanathan
10.	Effect of Organic manures, zinc and Copper on yield, content and uptake of nutrients by ragi (*Eleusine coracana* Gaertor) var. Co 11	N. Nagasundaram	Dr. K. K. Krishnamoorthy
11.	Effect of Ameliorants on sodic soil of Ramnad district and their influence on chemical characteristics, yield and uptake-Rice' (*Oryza sativa* L.) var IR 20	P. Paramasivam	Dr. Rani Perumal

AGRICULTURAL ENTOMOLOGY

Ph. D.

1.	Studies on *Farinocystis tribolii* Weiser'(Sporozoa, Neogregarinida) Infecting *Tribolium castaneum.*	R. Jebamoni Rabindra	Dr. M. Balasubramanian

2. Studies on Indian Eriophyoidea (*Trobidiformes: Acarina*)	M. Mohanasundaram	Dr. T. R. Subramani am
3. Studies on the Nuclear Polyhedrosis virus of Gram pod borer Heliothis armigera (Hubner) (Noctuidae : Lepidoptera)	K. Narayanan	Dr. T. R. Subramaniam
4. Studies on Host-resistance in certain Okra (*Abelmoschus esculentus* (Moench) varieties to the leaf hopper Amraeca devastans (Dist.) Cicadellidae : Homoptera)	S. Uthamaswamy	Dr. T. R Subramaniam

M. Sc. (Ag.)

5. Incidence of Borers in Sugarcane varieties in response to soil application of Gamma HCH and potash fertilizer	K. Ananthanarayanan	Dr. M. Balasubramaniam
6. Evaluation of Vamidothin (Kilval) and Phosalone Dt. (Zolone Dt) in the control of major pests of cotton	G. Chakkaravarthy	Dr. M. Balasubramaniam
7. Food utilization and life table studies on *Heliothis armigera* (Hubner) Noctuidae : Lepidoptera) on eight different food plants	N. Dhandapani	Dr. M. Balasubramaniam
8. Evaluation of Dinobuton Acrex 30 EC in the control of the mite *Tetranychus cinnabarinns* (Boised) (Tetranychidae : Acarina) A pest of bhendi (*Abeimoschus* esculentus L Moench and brinjal (*Solanum melongena* L.)	M. Ganesh Kumar	Dr. A. Abdul Kareem
9. Studies on the Ecology and control of the Mango Stemborer *Bactocera rufomaculata* DE GEER (Gerambycide : Coleopterq)	M. Gopalakrtshnan	Dr. M. S. Venugopal

10.	Studies on the performance of some persistent chlorinated Hydrocarbon insecticides in three soil types.	R. Jeyaraj	Dr. M. Balasubramanium
11.	Biology of *Meloidogyne arenaria* and *M. incognita* on chilli *(Capsicum annum Linn.)* and the damage caused by *M. areanaria*	K. Kandasamy	Dr. C. V. Sivakumar
12.	Disease complex involving *Rotylenchulus reniformis* and *Rhizoctonia solani* on Okra (*Abelmoschus esculentus*)	S. Kumar	Dr. C. V. Sivakumar
13.	Evaluvation of Dilute and concentrate sprays of certain insecticides for their efficacy against the pests of bhendi (*Abelmoschus esculentus* L. *Moench*) and cotton (*Gossypium hirsutum* L.)	N. Murugesan	Dr. A. Abdul Kareem
14.	Studies on the utility of neem (*Azadirachta indica* A. Juss) products against insect pesis of radish (*Raphanus sativus* L. and Okra (*Abelmoschus esculentus* (L) Moench)	M. Muthuraman	Dr. A. Abdul Kareem
15.	Effects of Allitin (Diallyl DI. and *Trisulfides)* on the growth and reproduction of the red cotton bug *Dysdercus eingulatus* Fabricius (Heteroptera Pyrrhocoridae)	V. Narayanan	Dr. M. Balasubramanium
16.	Studies on the effects of Difulbenzuron (1-(4 Chlorophenyl)-3, 2, 6 - Difluorobenzoyl Urea) on tobacco worm, *Spodoptera litura* Fabricius (Noctuidae: Lepidoptera)	R. Natesan	Dr. M. Balasubramanium
17.	Insect pests of sugar beet (Beta vuigaris L.) and their control	N. S. Rajmohan	Dr. A. Abdul Kareem

18.	Evaluation of Endosulfan (Endocel 35 EC) for the control of major pests of cotton	T. Viswanathan	Dr. A. Abdul Kareem
19.	Investigations on the life table and sesonal incidence of rice leaf roller, *Cnapha-locrocis medinalis G.*	M. Kalyanasundaram	Dr. S. Jayaraj
20.	Studies on varietal resistance, biology and control of Galerucid Beetle, *Madu-rasia obscurella* Jacoby affecting pulses	C. G. Loganathan	Dr. M. Gopalan
21.	Studies on biological activity of some plant extracts and Juvenile Hormone Analogues on *Dysdercus cin-guallus* and *Spodoptera litura* (lepidoptera : Noctuidae)	R, Madhusudhan	Dr. M. Gopalan
22.	Studies on the ecology and Biocontrol agents on the rice brown planthopper *Nilaparvata lugens* (Delphacidae : Hemiptera)	M. N. Manoharan	Dr. S. Jayaraj
23.	Studies on the ecology of tobacco capterpillar (*Spo-doptera litura F.* (Noctuidae : Lepidoptera)	S. Parasuraman	Dr. S. Jayaraj
24.	Studies of varietal resistance, biology and control of pod fly, *Melanagro-myza obtusa* in redgram (Cajanus cajan Mill sp.)	A. Piraviperumal	Dr. M. Gopalan
25.	Varietal resistance in chillies to thrips, *Scirtothrips dorsalis*	D. Ramadas	Dr. T. Kumarasami
26.	Further studies on the Okra red spider mite, *Tetrany-chus cinnabarinus* (Boisd)	K. Srinivasalu	Dr. T. Kumarasami

PLANT PATHOLOGY

Ph. D.

1.	Studies on the downy mildew disease of Pearl millet caused by *Sclerosdora graminicola*	M. Muthusamy	Dr. P. Narayanasamy

2. Studies on anthracnose disease of *Lablab niger* with special reference to host pathogen specificity	K. Ranganathan	Dr. P. Vidhyasekaran

M. Sc. (Ag.)

1. Studies on the Thanjavur wilt of Coconut (*Cocos nucifera*	R. Anbalagan	Dr. N. Shanmugam
2. Studies on blight disease of groundnut (*Arachis hypogea*)	P. Balasuburamanian	Dr. P. Narayanasamy
3. Studies on root-rot disease of Bengalgram	A. Chandrasekar	Dr. N. Shanmugam
4. Studies on the efficacy of new fungicides against crop diseases	S. Enayathulla Shah	Dr. V. Mariappan
5. Studies on *Pseudomnas solanacearum*	S. Eswaramurthy	Dr. T K. Kandaswamy
6. Studies on ring mosaic disease of groundnut (*Arachis hypogea*)	K. Rajagopal	Dr. P. Narayanasamy
7. Chemical control of leaf-spot disease complex in tomato and groundnut	R. Rajagopal	Dr. P. Vidyasekaran
8. Studies on the sheath rot disease of rice caused by *Sacrocledium attenuatum* and *Achrocy lindrium oryzae*	N. Rajendran	Dr. V. Mariappan
9. Studies on sheath blight of rice caused by *Corticium sasakii*	V. Viswanathan	Dr. V. Mariappan

HORTICULTURE

Ph. D.

1. Studies on the effect of plant growth regulants in flowering in some grape cultivars	J. B. M. Md. Abdul Khader	Dr. V. N. Madhava Rao

2.	Studies on induced mutation in Edward rose	I. Irulappan	Dr V. N. Madhava Rao
3.	An appraisal of edible diploids and synthetic hybrdis of banana	R. S. Azhakiamanavalan	Dr. V. N. Madhava Rao
4.	Studies on the effect of Nitrogen, Phosphorus and Pottasium on growth and flowering of Edward rose (*Rosa bourboniona* Desp.)	K. Nanjan	Dr. K.G. Shanmugavelu

M. Sc. (Ag.)

1.	Studies on the evaluation of some cultivars of grapes	T. Somakumaran	Dr. V. N. Madhava Rao
2.	Studies on the propagation of some bougainvillea cultivars	G. Mohan	Dr. V. N. Madhava Rao
3.	Studies on the propagation of patchouli	M. Selvarajan	Dr. V. N. Madhava Rao
4.	Vegetative propagation of Edward rose through cuttings	G. Balakrishnamoorthy	Dr. V. N. Madhava Rao
5.	Studies on the effect of time of pruning on growth and flowering in Edward rose *Sosa boubon'ana* Desp)	K. Muralidharan	Dr. V. N. Madhava Rao
6.	Studies on the effect of nutrients and their mode of application in Edward rose (*Sosa bourboniana* Desp)	S. M. Akbar	Dr V. N. Madhava Rao
7.	Studies on the propagation of Jasmine (Jasminum grandiflorum) cv.Jathimalli	P. Arukutty	Dr. V. N. Madhava Rao
8.	Effect of varying levels of N, P and K on growth, yield and quality of Co. 2 papaya	K. Kumaran	Dr. V. N. Madhava Rao
9.	Studies on the uptake of nutrients, growth and developments of Musa (AAA group, Cavendish sub. group). Robusta as influenced by parasitic nematodes.	C. Chinnadurai	Dr. V. N. Madhava Rao

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M. Sc. (Ag.)

10.	Variability studies in french beans (*Phaseolus vulgaris* L.)	P. V. Balashanmugam	Dr. K G. Shanmugavelu
11.	Line X Tester Analysis in Bhendi (*Abelmoschus esculentus* (L.) Moench) for some economic characters	M. Elangovan	Dr. C.R. Muthukrishnan
12.	Studies on Heterosis and combining ability in tomato (Lycopersicon esculentum Mill.)	P. Govindarasu	Dr. C.R. Muthukrishnan
13.	Variability studies in carrot *Daucus carota* L.)	P. Kumaresan	Dr. K.G. Shanmugavelu
14.	Growth analysis of inbreds and hybrids in tomato (*Lycopersicon esculentum*)	E. Palaniappan	Dr. C.R. Muthukrishnan
15.	Studies on salt tolerance of vegetable crops with special reference to tomato (Lycopersicon esculentum Mill.)	L. R. Rajasekaran	Dr. K.G. Shanmugavelu
16.	Studies on the growth and development of sweet potato (*Ipomoea batatas* Lam.)	B. Sampath Kumar	Dr. K.G. Shanmugavelu
17.	Studies on Heterosis in onion (*Allium cepa* L. *var eggregatum* Don.)	I. R. Suthanthirapandi	Dr. C.R. Muthukrishnan
18.	Heterosis and combining ability studies on onion (*Aiiium cepa* L. *Var aggregatum* Don.)	B. Vadivel	Dr. C.R. Muthukrishnan

SEED TECHNOLOGY

M. Sc. (Ag.)

1.	Studies on maturation, storability and quality of seeds of Bottlegourd *Lagenaria siceraria* (Mol) standl.	M. Chandrasekaran.	Dr. K. R. Ramaswamy

2.	Studies on the Development maturation and quality of seeds as influenced by phase of flowering in cotton (Gosspium hirsutium L.)	D. Jebaraj Enoch	Dr. K. R. Ramaswamy
3.	Studies on seed production and seed quality in Bhendi *Abelmoschus esculentus*. (L) Moench)	V. Palanisamy	Dr. K. R. Ramaswamy
4.	Studies on maturation and quality of seeds in Ribbed gourd (*Luffa acutangula* L.) and bitter gourd *momorandica charantia* Roxb.	A. Varatharaj	Dr K. R. Ramaswamy
5.	Studies on seed development maturation and storage in cowpea. *Vigna sinensis* L.)	P. Bhupathi	Dr K. R. Ramaswamy
6.	Seed maturation and storage studies in *Lab lab*. *Lab lab purpuous* (L) Sweet)	K. Shanmugaraj	Dr. K. R. Ramaswamy
7.	Seed quality studies in Dutta G. some important cultivars of Rice (*Oryza sativa* L.)	G. Dutta	Thiru V. Ramakrifhnan

AGRICULTURAL ECONOMICS

Ph.D.

1.	Intergrated Rural Development - An Approach for Block Level Planning in Nallampalli Block, Dharmapuri District, Tamil Nadu	S. Varadarajan	Dr. V. Rajagopalan
2.	An Analysis of Supply-Price Relationship of Rice in Tamil Nadu-A Micro-Macro Approach	C. Ramasamy	Dr. V. Rajagopalan

M.Sc.(Ag.)

1.	Decision Making under Risk -A Micro Level Analysis in Jayamkondam Block, Tiruchirapalli District	S. Rajamani	Dr. V. Rajagopalan

2.	Risk and Decision Making in Dryland Farming in Koilpatty Block, Tirunelveli District	S. Balasubramanian	Dr. V. Rajagopalan
3.	Economic Analysis of Production Costs, Resource Use Efficiency and Marketing of Hybrid Jowar Seeds in Coimbatore region	C. Ilango	Dr. P. K. Aiyasamy
4.	Labour Use Pattern and Employment Potential in Farms of Maduranthakam Block, Chingleput District	B. Ravichander	Dr. P. K. Aiyasamy
5.	A Study on Production Pattern and Market Structure for Robusta Banana in Uthamapalayam Taluk, Madurai District	K. Ramasubramanian	Dr. P. K. Aiyasamy
6.	An Economic Analysis of Production and Marketing of Banana in Tiruchirapalli region	S. Manivannan	Dr. P. K. Aiyasamy
7.	Integration of Tapioca Production with Processing-A Feasibility Study in Salem District	G Uthamalingam	Dr.A. Kandasamy
8.	A Study on the Pattern of Production and Marketing of Milk in Erode Taluk Tamil Nadu	P. Chinnaiyan	Dr. A. Kandasamy
9.	An Economic Analysis of Milk Production in the Intensive Cattle Development Projecr Area of Thanjavur District	R. Swamiappa	Dr. A. Kandasamy
10.	Dairy Development through Milk Co-operative - An Economic Analysis in Namakkal taluk,Salem District	G. Rangarajan	Dr. A. Kandasamy
11.	An Inter-Industry Analysis and Rural Structure in Dharapuram taluk	T. Kandasamy	Dr. S. R. Subramanian

12.	A Study of Economics of Sheep Production and Marketing in the Nilgiris District, Tamil Nadu	Rathina Jebackumar	Dr. S. R. Subramanian
13.	A Study on Consumption Pattern of Mutton in Coimbatore city	A. Muthukrishnan	Dr. S. R. Subramanian
14.	A Study on Incidence of Taxation and Taxable Capacity on Farms of Cuddalore Block	R. Manivannan	Dr. S. R. Subramanian
15.	Rural Credit: A Critical appraisal of the village Adoption Scheme in Coimbatore District, Tamil Nadu	P. Uday Sankar	Dr. S. Krishnamoorthy
16.	Capital & Equity in Farms: An Empirical Observation in Kabilamalai Block of Salem District	S. Gopalsamy	Dr. S. Krishnamoorthy
17.	A Study on crop Introduction and Resource Use Planning in Cauvery Delta -A Case for Cotton	M. Chidambaram	Dr S. Krishnamoorthy
18.	An Approach to Planning for Integrated Rural Development in Annur Block, Coimbatore District	M Shanmugam	Dr. S. Krishnamoorthy

AGRICULTURAL EXTENSION AND RURAL SOCIOLOGY

M. Sc. (Ag.)

1.	A study on utilization of farm information sources in the adoption process	M. Annamalai	Dr. A. John Knight
2.	Impact of Compact block demonstrations in dryland	K. Appavu	Dr. A. John Knight
3.	A study on the consequences of registered sugarcane cultivation	G. Chandrasekaran	Dr. A. John Knight

4.	Communication behaviour of regular and special village extension workers of Small Farmers Development Agency	S. Kanthasamy	Dr. D. Somasundaram
5.	A study on information need perception and adoption behaviour of big and small farmers growing potato	T. C. Mohanadasan	Dr. D. Somasundaram
6.	Factors influencing the use of farm machinery available at Agro - Engineering and Service (AE & SCC) Co-operative Centre by Small and marginal farmers	K. Muthuraj	Dr. D. Somasundaram
7.	Influence of family characteristics on communication channel utilization of dryland small farmers of progressive and less progressive villages	R Nelliappan	Dr. D. Somasundaram
8.	Information seeking and adoption behaviour of tapioca growing farmars	K. C. Ravi	Dr. A. John Knight
9.	Influence of farmers' characteristics and attributes of innovation of adoption	K. Sakthivel	Dr. A. John Knight
10.	Adoption behaviour of members and non-members of farmer's discussion groups.	V. Sekar	Dr. A. John Knight
11.	Needs, attitude, participation and preference of school going rural farm youths of Bodinayakanur	A. Shanmugam	Dr. D. Somasundaram
12.	A study on information need perception, credibility and source utilisation of dryland farmers	N. Sivanesan	Dr. A. John Knight
13.	Adoption of sericulture technology by trained sericulturists	V. Thangaraju	Dr. D. Somasundaram

14.	A multi dimensional study of farm credit of a nationalised bank	A. Thangavelu	Dr A. John Knight
15.	Incentives and disincentives related to the adoption behaviour of marginal and neomarginal farmers	S. Thyagarajan	Dr. D. Somasundaram
16.	Tribal leadership and communication behaviour in progressive and less progressive villages of Kolli hills	J. Vasantha Kumar	Dr. D. Somasundaram
17.	Communication behaviour of small and marginal farmers growing paddy	M. Vellaichamy	Dr. D. Somasundaram
18.	Critical analysis of the functioning of integrated dryland agricultural development project	R. Vijayaraghavan	Dr. D. Somasundaram

BIOLOGY

M. Sc.

1.	Studies on the microbiology of flours influenced by different storage conditions	B. S. Ajitha Kumar	Dr. D. Purushothaman
2.	Studies on the effect of paper industry effluents irrigation on certain common crops	P. Duraisamy	Dr. D. Raj
3.	Studies on the effect of herbicidal pollution on the growth and metabolic activities of *Azotobacter chroococcum* Beiz.	S. Gunasekaran	Dr. A. Balasubramanium
4.	Effect of press mud on physical, chemical and biological characteristics of common soils and on crop performance	Indira Raja	Dr. D. Raj
5.	Influence of some soil environmental factors on the growth, metabolism, survival and symbiosis of a *Rhizobium* Sp. (Cowpea group	N. Jothikumar	Dr A. Balasubramanium

6.	Effects of tannery effluent on physical, chemical and biological characteristics of common soils of Tamil Nadu and on performance of certain crops	N. Kamalam	Dr. D. Raj
7.	Studies on the effect of sugar mill effluents on certain crops and soil system	S. Kesindra	Dr. G. Oblisami
8.	Effect of industrial effluents on zoopalankton in the river Cauvery	G. Prabakaran	Dr. T. S. Muthukrishnan
9.	Effect of herbicidal pollution on the growth and metabolic activities of a *Rhizobium* Sp. (Cowpea group)	J. Ragavendra Rao	Dr. A. Balasubramaniam
10.	Recycling of sewage for the nitrogen environment of agricultural wastes	M. Sampathkumar	Dr. P. Rajasekaran
11.	Studies on the effect of viscose rayon factory effluents on crop plants, soil and aquatic systems	M. Thangaraju	Dr. D. Oblisami

PLANT PHYSIOLOGY

M. Sc.

1.	Physiological studies on fruit development in relation to growth habit in *Arachis Hypogaea* L.	R. Chandrababu	Dr. S. Gopalakrishnan
2.	Source regulation in blackgram	M. Leelavathi	Dr. S. Gopalakrishnan
3.	Physiological parameters for drought resistance in rice *Oryza Sativa* L.	S. Mohan Dass	J. Sakharam Rao
4.	Growth attributes of blackgram (*Vigno mungo* L.) in relation to yield	Y. Usha Rani	J. Sakharam Rao

AGRICULTURAL ENGINEERING

FARM MACHINERY

1.	Studies on some aspects of heat transfer in flat plate solar water heater	P. P. Perichiappan	Prof. K. R. Swaminathan

SOIL AND WATER CONSERVATION

1.	Studies on the effect of mulching on soil and water conservation	G. Balasubramaniam	Prof. R. K. Sivanappan
2.	Effect of saline water in drip irrigation system	V. Kumar	Prof. R. K. Sivanappan

ANIMAL SCIENCE

1.	Relationship of blood Glutathione level with production traits in Mayer strain White Leghorn layers	B. M. Eswaran	Dr. V. Rathnasabapathy
2.	Karyology and differential staining techniques of chromosomes of the Indian water buffaloes	V. Seihumadhavan	Dr. V. Rathnasabapathy
3.	Inheritance of intial egg quality traits in Meyer strain White Leghorn pullets	B. Kariabettan	Dr. Natarajan
4.	Study on the production and reproduction performance in crossbred cattle	K. M. Durairaj	Dr N. Natarajan
5.	Plasma alkaline phosphatase levels as selection index in poultry production	R. Govinda Rao	Dr. P. Kothandaraman
6.	Utilization of urea in stall Fed Kide	S. Arumugapernmal	Dr. J. Ernest
7.	The effect of salinity and total hardeness of drinking water on growth of chicks	S. K. Kalimuthu	Dr. R. Kathirvel

8.	Study on the anaesthetic properties of epontol (Propanidid B.P) in dogs	S. Thumburaj Gnanakkan	Dr. E. I. Rajendiran
9.	Some immunological studies in *Ancylostoma caninum* infections in dogs	S. Umamaheswari	Dr, E. Ebenezer Raja
10.	Faunistic study of the parasides of animals and brids of the children's park, Guindy, Madras	P. Lakshman	Dr. S. A. Joseph
11.	Studies on the Bionomics of the "Stick tight" flea *Echidnophaga* Gallinacea on domestic fowl Gallus	S. Lalitha	Dr. S. A. Joseph
12.	Studies on the Hippoboscidae of mammals and birds with special reference to Psedolynchia Canariensis As vector of Haemoproteus Columoae	T. V. Subbiah	Dr. S. A. Joseph
13.	Tubal patency studies on the she buffalo genitalia	V. Nagarajan	Dr. T.M. Thangaraj
14.	Studies on the effect of freezing and storage on morphological characteristics of bovine spermatozoa	P. Gnanaprakasam	Dr. T.M. Thangaraj
15.	Studies on the relative efficacy of FVT 300 for anoestrum in white cattle recovered from foot and mouth disease	S. Manjunath	Dr. K.S. Narasimhan
16.	Behavioural trends of mutton in different storage conditions	A. Chidambaram	Dr. E.S. Venkatesan
17.	Dressing, fabrication and quality characteristics of sheep carcasses	M. Sundaramurthy	Dr. E.S. Venkatesan
18.	Studies on the preparation of canned luncheon meat	G. Varadarajan	Dr. E.S. Venkatesan
19.	Antihistaminic therapy in bovine indigestion	V.S. Ramaswamy	Dr. V.V. Nagarajan

20.	Etiology and economy in the treatment of frothy bloat	W. Jeyakumar Samuel	Dr. V.V. Nagarajan
21.	Clinico - pathological studies and therapy of convulsion in calves	L. Jilasingh	Dr. V.V. Nagarajan
22.	Environmental pollution studies in an organised slaughter establishment	T.V. Ramesh	Dr. R.S. Viwanathan
23.	Study on some economic traits in Brown Swiss crossbred cows	F.S. Jesudasan Peters	Dr. M. Thiagarajan
24.	Incidence of respiratory and enteropathogenic virus infection in calves	K. Keerthivannan	Dr. P. Richard Masillamany